National and Trans-National Agendas in Antarctic Research from the 1950s and Beyond

Proceedings of the 3rd Workshop of the SCAR Action Group on the History of Antarctic Research

BYRD POLAR RESEARCH CENTER
THE OHIO STATE UNIVERSITY

BPRC Technical Report Number 2011-01

Byrd Polar Research Center
The Ohio State University
Columbus Ohio 43210-1002

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Cornelia Lüdecke, Lynn Tipton-Everett and Lynn Lay (Editors)

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BPRC Technical Report 2011-01

Compiled in 2011 by the

BYRD POLAR RESEARCH CENTER

This report may be cited as:

Lüdecke, Cornelia, Lynn Tipton-Everett and Lynn Lay (Eds.). 2012. *National and Trans-National Agendas in Antarctic Research from the 1950s and Beyond. Proceedings of the 3rd Workshop of the SCAR Action Group on the History of Antarctic Research.* BPRC Technical Report No. 2011-01, Byrd Polar Research Center, The Ohio State University, Columbus, Ohio, 162 pages.

Photo on the cover page is from The Ohio State University Archives, Papers of Admiral Richard E. Byrd, item #7957_1.

The Byrd Polar Research Center Report Series is edited by Lynn Tipton-Everett.

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Reprint from *International Commission of the History of Geological Sciences Newsletter* No. 40 for 2007, 25-26.

National and Trans-National Agendas in Antarctic Research from the 1950s and Beyond

Report of the 3rd Workshop of the SCAR Action Group on the History of Antarctic Research
25-26 October 2007, Byrd Polar Research Center, Columbus, Ohio, USA

Cornelia Lüdecke

The 3rd Workshop of the Action Group of the Scientific Committee on Antarctic Research on the History of Antarctic Research was organised by Raimund E. Goerler, Assistant Director of The Ohio State University Libraries and his colleagues at the Byrd Polar Research Center (Columbus, Ohio, USA) from 25-26 October 2007. This year the workshop discussed "National and transnational agendas in Antarctic Research from the 1950s and beyond". About 20 participants came from Australia, Chile, Germany, Great Britain, Sweden and USA.

After the welcome speeches and a review on the history of the action group, which was founded in 2004, the first session of the workshop started with Peder Roberts (Department of History, Stanford, USA), who asked the question "What Has All This Got To Do With Science?" and presented the "Rhetoric of Scientific Devotion in the Planning of the International Geophysical Year" (IGY, 1957-1958). His answer showed that on the surface, everything functioned as an emblem of international co-operation in scientific endeavour. However people have to ask how and why the IGY came to possess that symbolic value, and to consider it as an integral part of a broader political picture.

Jason Kendall Moore's (Centro de Estudios Hemisféricos y Polares, Viña del Mar, Chile) paper was titled "Playing Dice: Toward a Scientific Explanation of U.S. Leadership in the Formation of the Antarctic Treaty of 1959". Moore focused on inconsistency of the American leadership with a number of other factors which nearly led to the treaty's non-ratification, and which exposed the non-commitment of U.S. officials to their own policy.

In the second session Rip Bulkeley (Exeter College, Oxford, United Kingdom) analysed "The Role of Antarctic Diplomacy in the Origins and Conduct of the IGY", which culminated in France being the first and still the only country with an Antarctic claim to install a permanent station outside 'its' sector 46 years from the signing of the Treaty.

In the second session after lunch break outside in the sun, Jorge Berguño (Chilean Antarctic Institute, Santiago, Chile) explained "The Search of an Organisational Framework for Antarctic Research (1948-1985)". The course of IGY demonstrated that binding undertakings and concerted action in scientific programmes could be achieved without transferring all the authority to a single scientific body. In 1958, ICSU established the Special (later Scientific) Committee for Antarctic Research (SCAR). In 1985 SCAR was fully incorporated as a permanent observer into the mainstream of the Antarctic Treaty System (ATS).

In this context M. Consuelo León Wöppke (Universidad Marítima de Chile, Chile) presented an interpretive analysis of "The state of Chilean science before and during the International Geophysical Year", before the Chilean emphasis shifted to the role of political and scientific elites in shaping public opinion.

Cornelia Lüdecke (SCAR History AG, Munich, Germany) referred to a country which did not actively take part in the today called 3rd International Polar Year in talking about "The International Polar Year (1957-1958) as Reflected in German Media". The time of the Cold War was characterised by the use of military terms to describe interests in Antarctica. This was clearly visible in the analysed western German newspapers and even in popular books on Antarctic research of the 1950s.

Ann M. Dozier (University of Rochester, Rochester, New York, USA) gave a lively report of her investigation of "Getting the Science Done: Perspectives from McMurdo" during three austral summers between 2002 and 2005. She observed how organisational bureaucracy and the scientists' professional autonomy created inherent tensions and how these were exacerbated by the uncertainties of conducting science in a polar environment.
The first day finished with a workshop dinner and a pleasant dinner speech by Tim H Baughman, (University of Central Oklahoma, USA) on „Amundsen, Cook and the *Belgica*, the first international scientific and multi-national expedition to the Antarctic".
The 3rd session on the next day started with Jason David (The Ohio State University, Columbus Ohio, USA), who dealt with "The development of biology as a discipline in Antarctica", its growth in the amount undertaken particularly on the Antarctic continent and its connection to larger trends in both the history of biology and the context of Antarctic science.

Adrian Howkins (University of Texas at Austin, Austin, USA) talked about "British Antarctic Science, 1944-1959", which first was increased on the Antarctic Peninsula, before it co-operated with international research efforts. Finally Britain sought to harness the scientific goodwill generated by the IGY to bring about political change in Antarctica leading to the Antarctic Treaty of 1959.

Then the IGY veteran John C. Behrendt (University of Colorado, Boulder, CO, USA) reminded us to the "First (1957-58) Geophysical Investigation of the Filchner-Ronne Ice Shelf (FRIS)". He discussed the results including the determination of maximum ice thickness of the southernmost area of the FRIS of 1300 m which was in significant contrast to a re-measurement of this area in the 1990s of only 1100 m suggesting significant melting during the interval.

Aant Elzinga (University of Göteborg, Göteborg, Sweden) focussed on the discussion of the European Antarctic Project (EAP) abandoned in 1975 and the multinational European Project for Ice Coring in Antarctica (EPICA) starting up in 1995 seen as "The shaping of a European Effort in Paleoclimatology".

In the 4th session after lunch break in the polar library, Irina Gan (University of Tasmania, Australia) led us "To the great unknown: Soviet IGY Antarctic Expeditions 1955-1958". The setbacks and obstacles encountered by the 2nd Russian Antarctic expedition in particular almost

resulted in failure of the whole Soviet IGY commitment. Nevertheless obstacles were overcome and plans finally concluded successful.

The last paper was given by Lisbeth Lewander (University of Göteborg, Göteborg, Sweden) on "Swedish Polar Politics 1955-1970", when Cold War developments in the Far North were severe concerns, which had an impact on Swedish undertakings in polar areas. Archive studies showed that occasionally decision makers were hesitant on what course on action to depart upon, such as in the case of the political status of Antarctica in the 1950´s.
After the workshop, participants left home with very good memories of interesting discussions and exchange of various aspects of the history of polar research around the IGY.
The Proceedings of the 3rd SCAR workshop on history of Antarctic research will be published in the electronic series of the Byrd Polar Research Center as part of the Digital Repository of the Knowledge Bank of the Ohio State University.

The next presentations of the SCAR history AG will be in the session 5.7 on "Polar History and Institutionalisation of Polar Research - The International Polar Years" during the SCAR/IASC Open Science Conference in St. Petersburg, 8-11 July 2008.

The 3rd SCAR workshop was supported by the Scientific Committee on Antarctic Research Cambridge (UK); the Byrd Polar Research Center and the Friends of the Byrd Polar Research Center, Columbus (USA); the Frederick A Cook Society (USA); Schimank-Stiftung, Hamburg (Germany); and Deutsches Zentrum für Luft und Raumfahrt, Oberpfaffenhofen (Germany).

OPENING SPEECH 25 OCTOBER 2007

Cornelia Lüdecke

Welcome to all participants of the 3rd SCAR Workshop here in the Byrd Polar Research Center, Columbus, Ohio, where we will discuss a total of fourteen papers that will be presented by the SCAR Action Group on the History of Antarctic Research. You may ask what this so called "Action Group" is all about.

The former SCAR president Prof. Thiede from the Alfred Wegener Institute for Polar and Marine Research in Bremerhaven asked me during the 21st International Polar Conference at Kiel (Geomar) in March 2003 to initiate an international group of SCAR members and other scholars to work on the history of Antarctic research in connection with the coming 50th anniversary of SCAR, which will be celebrated in St. Petersburg next year.

I started to send many letters to friends and some others whose addresses had been provided to me. This resulted in a collection of promoting letters and an informal application to establish a SCAR group on the History of Antarctic Research. But unfortunately the SCAR secretariat was unconcerned and unclear as to where or how such a group would fit within the existing SCAR framework. This was only the start of my efforts. I had so much more work ahead of me.

A correspondence started with the SCAR secretary general at that time, Peter Clarkson, who turned out to be very helpful. He suggested our group should become an Action Group under the Delegate Committee on Standing Committees and Outreach. He informed me that the Action Group might prepare a history of research in the Antarctic with particular reference to SCAR and its role. The group would have a limited lifespan and would be expected to complete its research and prepare a publication by 2007.

On 7th January – it's already the year 2004 – I wrote my first two page application to create such an Action Group upon which should be decided during the SCAR executive meeting in Bremerhaven on the coming 20-21 January.

The result of the discussion was presented in an email by the new secretary General Colin Summerhayes. During the meeting at Bremerhaven it had been decided that I should write a full proposal (which meant 15 pages of text) to be discussed by the next SCAR delegates meeting in Bremen in October of the same year.

At that stage I was wondering, why I have to make such an effort. Do the delegates really want to read so much about something wanted by the SCAR leadership? Later I was told the background. The SCAR delegates were not aware that the initiative did not come from me – a person unknown to all except one of them – but from the SCAR president himself.

Well. I had to prepare a full proposal which had been hard work for a non-native English speaker, but with the help of our Swedish colleague Aant Elzinga I finally wrote ten pages.

Our aim should be to "*obtain insight in the development, how Antarctic research was institutionalized within SCAR, to what degree research in the Antarctic has been driven by scientific criteria and to what extent compromises were made in the light of political barriers and logistical limitations. In historical perspective, a review will be made of essential background factors at work, both scientific and non-scientific ones, when nations were moved to participate in the International Geophysical Year (IGY, 1957-1958) at the time of the Cold War. Additional socio-cultural background factors will be considered with regard to major nations that chose not to contribute to the IGY*."

According to this the group should work on the "History of Institutionalization of Antarctic Research within SCAR". I made it clear that we do not want to provide a history of the foundation of SCAR or of the development of SCAR within its first 50 years. This is left for others. I submitted my full application in July 2004

During the first SCAR Open Science Conference at Bremen (Germany) in July 2004 I was searching for possible members to form an action group. Some of you may remember when I introduced myself during the dinner party at the Bremen Science Center. I was lucky to find some people who were interested in joining the group.

Finally five months later, I received an official answer by Colin Summerhayes saying that "*The delegates agreed to establish an Action Group that would report to the Delegate Committee on Outreach and Administration. It was expected that the Group would be chaired initially by C. Lüdecke. The Group must have a broad international membership as similar research is on-going or has been done in several nations*." We have made it, after 21 months!

"**Steps of Foundation of Institutionalized Antarctic Research**" became the title of the 1st SCAR Workshop on the History of Antarctic Research, which I would organize at the Bavarian Academy of Sciences and Humanities in Munich (Germany) from 2 – 3 June, 2005.

We had a wonderful participation of graduate students (including several PhD students), polar researchers, science historians, and Antarctic veterans. Apart from the oral presentations we had some posters and two additional written contributions. Due to the location at the Bavarian Academy of Sciences we included a description of the Filchner expedition to the south-eastern Weddell Sea in 1911-1912, because the Academy houses the Filchner Archives. Besides – when one of the planned speakers could not come – we had an additional paper on Georg von Neumayer, one of the founders of the 1st International Polar Year, which did not really fit into the time period given for our work, but it was important for understanding the origin of the Polar Years.

When we had to decide where to meet for the second SCAR history workshop, our colleague Jorge Berguño from the Chilean Antarctic Institute invited us to come to Santiago de Chile in 2006. This was a very good idea, because it opened the possibility to include South American colleagues to join the Action Group, which worked out very nicely.

So with the wonderful help of Jorge we have had the 2nd SCAR History Workshop on "**Multidimensional Exploration of Antarctica around the 1950s**" in the building of the Ministry of Foreign Affairs in Santiago de Chile from 21 - 22 September 2006.

After the 1st and the 2nd workshop were completed papers were written by the presenters, reviewed by two of the participants and accepted in revised form. An extended index was added and finally the proceedings of the first workshop were published in the Reports of Polar and Marine Research of the Alfred Wegener Institute in Bremerhaven in September 2007. With this achievement the originally demand of a publication in 2007 is fulfilled. We still work on the proceedings of the 2nd workshop.

Now we have the pleasure to be here at the Byrd Polar Research Center to have our 3rd SCAR Workshop on "**National and Trans-National Agendas in Antarctic Research from the 1950s and Beyond**", from 25 –26 October, 2007. I guess that we all look forward to it.

Concerning the next meeting 2008 I have been already asked by SCAR to organize a session during the SCAR/IASC 2008 Open Science Conference (OSC) on "**Polar History and Institutionalization of Polar Research – The International Polar Years**" at St. Petersburg, Russia from 8 – 11 July 2008.

The secretary General already told me that SCAR wants a continuation of our group, which has to be discussed during the Delegates Meeting in Moscow after the St. Petersburg conference next year, thus we have to discuss this tomorrow after the end of the workshop. My idea is, if we continue with our workshops we should not exclude Arctic research, because both belong together. For instance Svalbard had been the place for many training expeditions of people going to Antarctica. Similarly, experiences from ice core drilling in Greenland are very useful for drilling in the Antarctic.

My idea is to maintain a group on history of polar research that is not restricted to the time period starting with the International Geophysical Year. Otherwise we could form an International Commission on History of Polar Research (ICHPOR) within the International Union of History and Philosophy of Science / Division on History of Science and Technology.

Let's keep this in mind during the next two days.

Herewith I want to open the 3rd SCAR history workshop.

‘WHAT HAS ALL THIS GOT TO DO WITH SCIENCE?’ THE RHETORIC OF SCIENTIFIC DEVOTION IN BRITISH GOVERNMENT PLANS FOR THE INTERNATIONAL GEOPHYSICAL YEAR

Peder Roberts

Abstract

Recent scholarship has begun to emphasize the political dimension of the International Geophysical Year (1957-58, hereafter IGY). This paper examines British government reactions to the IGY Antarctic program. By focusing on policymakers rather than scientists, a picture emerges of the IGY as a crisis rather than an opportunity, embedded in Britain’s wider struggle to adjust to new geopolitical circumstances. The IGY Antarctic program is considered within the context of British Antarctic activity at the time, including the Falkland Islands Dependencies Surveys (FIDS), the Norwegian-British-Swedish Antarctic Expedition (NBSX), and the British Commonwealth Trans-Antarctic Expedition (TAE). Each project performed a political function but with different rhetorical markers and modes of organization (including funding): respectively as an instrument of colonial occupation, an exercise in limited multilateral cooperation, and an attempt to assert the Commonwealth as a meaningful political unit. The IGY reshaped the mode of political engagement with the Antarctic by entrenching a rhetoric of scientific devotion. For Britain, a strategy of strong demarcation between scientific and political activity might safeguard its territorial claims from effective occupation by other IGY parties. But the construction of a sharp rhetorical distinction between science and politics did not mean the IGY was an apolitical event: instead, it echoed contemporary geopolitical trends in which displays of scientific strength outweighed colonial-era histories. The game of separating sovereignty from IGY activity ultimately became irrelevant amid the new political geographies of the 1950s.

Introduction

The fiftieth anniversary of the International Geophysical Year (IGY) has prompted a welcome renewal of scholarly attention.[1] There is much to reconsider. Scientists have long characterized the event as a triumph, demonstrating that international cooperation in the name of science could transcend political divisions, even at a time of significant Cold War tensions.[2] This is especially true of the IGY Antarctic program, regarded by many scientists and historians as an important step on the road to the Antarctic Treaty (ratified in 1961).[3]

As morally agreeable as this view may seem, it significantly underplays the role of government actors in facilitating the IGY and shaping its rhetorical construction as a scientific rather than a political event. The Antarctic Treaty reinforces this view with its apparent demarcation of Antarctica as a space uniquely suited to scientific activity. At a time when competition for

[1] The work of the SCAR History Group has been crucial in this regard. See the special 2007 volume of Berichte zur Polar- und Meeresforschung (560), Steps of Foundation of Institutionalized Antarctic Research; the special October 2008 edition of the Journal of Historical Geography (34); Dian Olson Belanger (2006); and Friedman (2004).
[2] This may be seen both in contemporaneous accounts such as Dufek (1957) and J.T. Wilson (1961).
[3] Bulkeley (2009) has surveyed the relevant literature and concluded that no historical consensus exists on whether the IGY led causally to the Antarctic Treaty.

natural resources has reemerged – oil and gas in the twenty-first century, rather than gold, uranium, and whales in the twentieth – the Treaty today appears more a fragile artifact than the embodiment of enlightened modernity, despite some hopeful suggestions that its main tenets could be applied to a future Arctic Treaty. The contingency of the Treaty's construction thus returns to the spotlight, and with it, the construction of Antarctica as a space for science during the 1950s. I take my cue from scholars such as Klaus Dodds,[4] Ronald E. Doel,[5] Aant Elzinga,[6] and Adrian Howkins[7] who have begun to integrate both the broad currents of Cold War international relations and the specific relevance of Antarctic science to analyses of the IGY Antarctic program. These perspectives do not question whether scientists felt the IGY effort in Antarctica was a good thing, but ask how and why the massive financial resources it required were mobilized: in short, how states became interested in Antarctic science rather than why scientists became interested in Antarctica.

The aim of the present paper is to build from these foundations in two new directions. First, I base my study on British rather than American discussions, revealing a defensive and reactive approach to the IGY Antarctic program that bore parallels to Britain's growing marginalization in a geopolitical environment marked by decolonization and superpower duopoly. State support for Antarctic science derived from a particular set of political motives based on the preservation of territory and prestige. Science could function as a tool of statecraft, but when practiced without awareness of overarching political constraints, it could actively undermine state aims. The IGY Antarctic program therefore presented Britain with a crisis rather than an opportunity. Second, I consider the devotion to science that characterized the IGY not as a transparent commitment, but as a discursive convention that governed permissible actions in a particular setting.[8] This permits a deeper level of analysis than simply observing that specific scientific activities could possess hidden political motives. As perhaps the ultimate symbol of civilized modernity, 'pure' science provided a powerful source of legitimacy for engagement with the Antarctic, and for ostentatious displays of state power.[9]

British Political Attitudes to Antarctica Leading up to the IGY

From the 1930s onward Britain adopted a defensive position regarding its Antarctic territories. Having formally expanded the Falkland Islands Dependencies (FID) in 1908 and 1917 as well as facilitating Australian and New Zealand claims during the 1920s and 1930s, Britain along with its former colonies claimed title to well over half the Antarctic land mass. Like the smaller French and Norwegian claims, these were based on historical discovery and vulnerable to legal arguments based on occupation or engagement. This was especially true in the FID as the decline of shore-based whaling eliminated an important form of administrative activity.[10] Concern over

[4] Dodds (2002; 2008).
[5] Doel (2003).
[6] Elzinga (2007).
[7] Howkins (2008a).
[8] This approach draws on Aant Elzinga's argument that clear rhetorical demarcation between politics and science sublimates the former beneath the latter rather than creating an 'apolitical' sphere. See Elzinga (1993).
[9] This was never more clear than during the Space Race – itself an outgrowth of the IGY. See for instance McDougall (1985).
[10] For discussions of the legal bases of Antarctic territorial claims during this period, see for instance Beck (1986); Jacobsson (2004); Quigg (1983).

Argentine claims in the Antarctic Peninsula led to the initially secret Operation Tabarin, dispatched in 1943 to establish a more permanent British presence. At the end of the Second World War Operation Tabarin was renamed the Falkland Islands Dependencies Survey (FIDS) and placed under the formal control of the Colonial Office. It remained Britain's primary instrument in the quest to preserve control of the FID during the early postwar years.[11]

The mission of FIDS included surveying and descriptive scientific work as well as removing artifacts denoting Argentine and Chilean sovereignty, such as flags.[12] The FIDS Scientific Director during the 1950s, Vivian Fuchs, would later describe this work as a 'politico-scientific' exercise.[13] As well as demonstrating British sovereignty, FIDS performed a range of surveys over a vast and in parts inaccessible area to determine which regions held most potential value (both economic and strategic) in the event of international arbitration or a negotiated settlement of Antarctic territorial claims.[14] This form of Antarctic field science was fundamentally a political performance, a costly process with ever-present risks both to human life – three men were killed in 1948 alone – and to national prestige, for instance if staff needed to be rescued by a foreign power.

The costs of continuous engagement help explain why the Foreign Office was increasingly open to some form of international settlement of Antarctic claims, as long as it formally legitimized British sovereignty and took place on Britain's terms. In March 1946 a group of South African geologists quietly suggested an 'international polar year' but received a strongly negative reaction from Whitehall because it could invite unwelcome competition. The Interdepartmental Polar Committee – formed in 1928 to coordinate British and imperial policy in the Arctic and Antarctic regions – recommended instead that Commonwealth states discreetly strengthen their claims individually without pursuing a premature international project, a move with limited relevance to South Africa as a non-claimant state. The primary reason for rejecting the South African plan was not fear of Argentine or Chilean claims, but fear of providing the USSR with a pretext for becoming involved with Antarctica.[15] Indeed, when the United States proposed a 'condominium' sharing power between itself and the seven other states claiming Antarctic territory (thus excluding the USSR), Britain was the only other state to respond positively.[16]

The British Government offered both moral and financial support to one international venture, the Norwegian-British-Swedish Antarctic Expedition of 1949-52 (NBSX), because it would help solidify Scandinavian backing for British claims in a future international settlement.[17] Developed from an idea by the Swedish geographer and glaciologist Hans W. Ahlmann, the expedition was organized by an international committee. Ultimate responsibility rested with the Norwegian Polar Institute (founded in 1948), which – as Robert Marc Friedman has shown – was a powerful symbol of Norway's commitment to playing a leading role in progressive engagement with its territories in the polar regions, down to head-hunting the distinguished oceanographer Harald Ulrik Sverdrup from the Scripps Institution of Oceanography at the University of California (San

[11] The inception and history of Operation Tabarin are described and analyzed in Howkins (2008b).
[12] This dual remit is discussed in Dodds (2000).
[13] Fuchs (1982: 11).
[14] See for instance United Kingdom Foreign Office (March/April 1949).
[15] Interdepartmental Polar Committee (26 March 1946).
[16] See for instance P.J. Stirling (11 April 1949).
[17] On the origins of the NBSX, see Friedman (2004) and Lewander (2007), 123-141.

Diego) as its first leader.[18] The expedition's carefully crafted public image as a purely scientific venture accorded with this aim and enhanced its value as an instrument of state prestige.
For Britain the NBSX represented safe, mutually strengthening cooperation between established Antarctic stakeholders, even though it did not visit any British territory. Sir Evelyn Shuckburgh of the Foreign Office characterized it as 'the sort of scientific cooperative effort in which we ought to take a lead, as it supports the theory that we believe in an "open door" in the Antarctic.'[19] Drawing upon scientists from all three states and sporting a multinational organizational structure, the NBSX symbolized progressive cooperation.[20] While exclusively national activities such as FIDS demonstrated that Britain was effectively engaging with its territory, international activities like the NBSX could preserve Britain's strong position within a concrete multilateral framework.

Internationalism did not mean extending an equal welcome to all states; indeed, the organizational structure of the NBSX showcased a particular mode of mutually reinforcing cooperation between states with existing Antarctic interests. Interwar conflicts between Britain and Norway over the status of Bouvet Island and the boundaries of the Australian Antarctic Territory,[21] while serious at the time, were by now secondary to their joint status as claimants to Antarctic territory with a preference for administrative structures that privileged historical engagement. The experiences of World War Two had strengthened the political relationship between the two states, and Norway's close links to Britain even led to official discussions about the possibility of its joining the British Commonwealth during the 1950s.[22] The NBSX represented (cautious) multilateralism in which Britain was a partner. Strongly progressive rhetoric successfully effaced its aim of preserving the national prestige acquired during earlier decades.

On the other hand, it is crucial to consider FIDS as a component of British colonial policy. Operating under the authority of the Colonial Office and the Governor of the Falkland Islands, FIDS represented a mode of activity aimed at defining a British world rather than representing Britain within an open sphere. The massive geopolitical readjustment following World War Two produced an entirely different world order that undermined imperial power as defined earlier in the century, both on pragmatic and moral grounds. John Kent has argued that Britain initially attempted to balance the US and Soviet resource bases through an imperial-style arrangement between Europe and Africa, with the 'special relationship' between the US and the UK secondary while the latter attempted to find a position of independent strength.[23] The brief symbolic power of the Commonwealth[24] derived from its status as a new articulation of empire – the same reason for its ultimate impotence.

A third mode of Antarctic exploration drawing on colonial legacies came to the foreground after the return of the NBSX in 1952. From early 1953 figures including Sir Miles Clifford (Governor

[18] Friedman (1995).
[19] Shuckburgh (4 December 1948).
[20] The characterization of the NBSX as a distinctly new and progressive event is clear from the official published account by expedition leader John Giæver (1954).
[21] See for instance Grenfell Price (1963: 14-27).
[22] See for instance United Kingdom Foreign Office (1953).
[23] Kent (1993).
[24] See for instance Hansen (2001) and Webster (2005).

of the Falkland Islands), Vivian Fuchs, Sir James Wordie (polar veteran and key figure at both the Scott Polar Research Institute [SPRI] and the Royal Geographical Society) and Air Marshal Sir John Slessor championed plans for a crossing of the continent via the South Pole, conducted entirely across territory claimed by the Commonwealth. This would complete Ernest Shackleton's aborted Imperial Trans-Antarctic Expedition of 1914-16, in which Wordie had participated, and secure prestige for the British Commonwealth through the performance of a historically resonant feat. Prospective leader Fuchs argued that '[a] trans-continental journey made wholly within territory claimed by the British Commonwealth … would gain prestige and at the same time contribute to the solidarity of Commonwealth interests.'[25] The Commonwealth Relations Office (until recently the Dominions Office) quickly saw the emblematic value of the plan and offered full support. Whereas FIDS epitomized quiet but functional occupation aimed at strengthening British sovereignty, a trans-Antarctic crossing could earn prestige by demonstrating the Commonwealth's vitality, much like the 1953 ascent of Mount Everest (which Wordie also played a key role in organizing). It is no coincidence that Sir Edmund Hillary of Everest fame was chosen to lead the expedition's main support party.

The three modes of operation symbolized by FIDS, the NBSX, and the Trans-Antarctic Expedition (TAE) were not *a priori* incompatible, but they reflected different approaches to an evolving problem. Strengthening Britain's current claims (such as through FIDS) would enhance its negotiating position when some form of international agreement was eventually reached, ending the need for continuous expenditure that post-war Britain could ill afford. However, open-ended scientific programs could allow the United States and – far worse – the Soviet Union to establish significant presence in the Antarctic, their greater resources enhancing their bargaining power at any future international settlement while diminishing the prestige of historical achievements. Joint ventures such as the NBSX that foregrounded science reaffirmed British commitment to progressive international cooperation while solidifying existing territorial arrangements. If the TAE generated sufficient recognition and prestige it could alleviate the latter concern, but its value derived from rhetorical resources that were losing traction, and it risked being overshadowed by the IGY.

Early British Reactions to the IGY

As is well known, the IGY was conceived as a successor to the previous International Polar Years in 1882-83 and 1932-33,[26] but neither had significant political consequences. Consequently, it was understandable that Whitehall should hope this situation would be replicated during the IGY. Word of the planned event first reached Whitehall in early 1952, but did not attract much attention, although Robert Cecil suspected the event could lead to 'awkward possibilities' involving the USSR.[27] The assumption within the Colonial Office was that the Royal Society would probably decide to send a party to the FIDS, at which point government

[25] Fuchs (undated).
[26] This account is reproduced in many places. See for instance Fogg (1992: 168-69) or Walton and Doake (1987: 32).
[27] The first mention of the IGY in Colonial Office files is a note by 'JMM' (15 December 1951) inquiring about rumors that had been circulating. Cecil's note (to J.S. Bennett) was from 8 March 1952.

would be asked for financial support, preferably as a discrete entity so as not to detract from the budget or remit of FIDS.[28]

Shortly afterward the IGY also came to the attention of the Foreign Office. The Foreign Office's Antarctic specialist during this period was Brian Roberts, veteran of the 1934-37 British Graham Land Expedition and part-time employee of the SPRI in Cambridge.[29] Roberts' detailed and multifaceted knowledge of polar issues ensured his voice commanded attention, if not always authority. As early as 1954 he noted that the IGY would:

> stimulate a great deal of polar activity which would otherwise probably not occur … I am beginning to think that we should … arrange … declarations that Antarctic activities connected with the I.G.Y. are scientific and not directed to political ends. This kind of thing is likely to be favoured by all the key people who have initiated the I.G.Y. Otherwise we may all find ourselves involved (without anyone wishing it) in a competition where each country tries to demonstrate that it is best qualified to cover the Antarctic part of the programme.[30]

For Roberts, characterizing the IGY as apolitical was an effective means of separating its activities from potential sovereignty implications. Roberts was by no means advocating a normative antithesis between science and politics: in fact, his advocacy of a more politically engaged vision for the SPRI would ultimately be responsible for his eventual marginalization at the organization he considered his spiritual home.[31] Using metropolitan expertise to develop the colonial periphery was a well-worn theme in British statecraft. In the early post-war years the scientific expert was an increasingly visible driver of progress within the Commonwealth,[32] but this represented the application of new tools within an old colonial order. By contrast, the IGY was an international scientific event in which the superpowers might become heavily invested, and Britain's role would not reflect the historically dominant position it had enjoyed.

As Roberts saw it, the best hope to manage the IGY lay in constructing it as a purely scientific event without any political dimension. Rigid boundaries between scientific and political realms, with the IGY located in the former, represented the best hope for Britain to preserve its territorial position. This placed the IGY into a separate category from nationally-organized scientific operations such as FIDS that possessed an explicit political purpose. If the IGY could be driven by scientists interested narrowly in their own research projects, and if it could be kept separate from the bigger geopolitical picture, the storm might pass without consequences for sovereignty.

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[28] See in particular J.S. Bennett's note (15 March 1952) from a lunch meeting with James Wordie (at the time involved with both FIDS and the informal Polar Year committee through the Royal Society).

[29] It is to be regretted that no biography of Roberts has yet been written, though an illuminating set of recollections have been published (King and Savours [eds], 1995).

[30] Roberts (28 October 1954).

[31] Debenham to Roberts (15 October 1942) and Roberts to Debenham (21 October 1942). Roberts fell out with SPRI Director Frank Debenham in 1942 when the latter took umbrage at Roberts's characteristically ambitious and wide-ranging analysis of the organization's future direction. Debenham was uncomfortable with any change from the Institute's mission as an aid to explorers. Roberts was later overlooked for the SPRI directorship in the 1950s in a move that signaled the Institute's new state-directed role as a scientific research unit attached to Cambridge University rather than an information center serving British interests.

[32] See for instance MacKenzie (2001: 29).

When it became apparent by early 1955 that the IGY would involve substantial state-sponsored Antarctic activities, especially from the United States, British policymakers quite understandably saw it as a growing crisis. An event on this scale could not be kept free from contemporaneous political dynamics. The Foreign Office worried that plans for a definitive territorial settlement would be sidelined until after the IGY, by which time Britain's strong history of Antarctic engagement could easily be overshadowed by the massive programs from other nations.[33] Even if declarations of apolitical intent could be translated into a formal separation between sovereignty and IGY activity, the prestige associated with such massive achievements could not be demarcated away. The strong rhetorical devotion to science that came to characterize official United States and Soviet IGY statements transformed Antarctica from an object for political administration to a theater for scientific prowess.[34]

As originally envisioned, the Royal Society was responsible for organizing Britain's participation in the IGY, although the Foreign Office in particular was increasingly aware of potential political difficulties. To maintain sovereign authority over its Antarctic territories Britain required any states wishing to work inside FIDS to seek formal permission, thereby recognizing Britain's status as the sovereign power. The immediate threat came from Chile and Argentina, which Britain countered with increased short-term FIDS activity to shore up its current position and a proposed application to the International Court of Justice for a definitive settlement. The major concern for both Britain and the United States was the Soviet Union, which had begun to highlight its historical engagement with the Antarctic (through the voyages of Thaddeus von Bellingshausen in the early nineteenth century) while increasing its role in the Antarctic whale fishery.[35] Without any territorial claims of its own the USSR could entrench its presence without being bound to any mutual recognition – such as that between the territorial claims of the UK and Norway. From late 1954 the US pressured Britain to occupy a station at Vahsel Bay in order to forestall a possible Soviet base, believing there was 'no doubt that some kind of an accommodation could be worked out between our two Governments and that the important thing was to keep out the Communists.'[36]

Those currents extended to the meetings of the *Comité Spécial de l'Année Géophysique Internationale* (CSAGI), through which the IGY Antarctic program was organized. Before the first major planning meeting, held in Paris in July 1955, the Royal Society delegation was thoroughly briefed on the implications of base locations for British territorial rights. Following the policy of demarcation between IGY activities and sovereignty, delegation leader Sir David Brunt was instructed to formally state that the Royal Society was a 'non-government organization and that anything said during the discussions on Antarctica at the Conference cannot in any way be held to prejudice the position of Her Majesty's Government as regards United Kingdom sovereignty over the Falkland Islands Dependencies.'[37] The statement shored

[33] See in particular United Kingdom Chancery in Moscow (25 August 1955).
[34] Both the US and the USSR engaged in highly symbolic Antarctic projects, with the former establishing a base at the South Geographic Pole and the latter making the first journey to the Pole of Inaccessibility.
[35] Soviet statements about the Antarctic were summarized and critiqued by Roberts (March 1955).
[36] Wilkinson (15 December 1954).
[37] Man (undated).

up Britain's position in regards to territory while doing nothing to address the IGY's value as a source of political capital through prestige.

Both the Foreign Office and the Colonial Office underestimated the scale of planned IGY activity and the number of non-territorial angles with political ramifications. When the results of the Paris meeting reached London the Foreign Office expressed unhappiness at Argentina's apparent dominance of activities on the contested Antarctic Peninsula. J.S. Whitehead of the Foreign Office was disappointed at the British delegation's apparent naivety, complaining that '[t]he United Kingdom appears to have come out of this conference very badly … Politics, without doubt, are playing a considerable part in the IGY and the sooner the U.K. delegations realize this and act accordingly, the better.'[38] Humiliatingly, British stations would apparently be in radio frequency groupings centered on Argentine stations. This caused the Colonial Office to consider advocating complete British withdrawal from the IGY,[39] as though Britain could make the event go away simply by choosing to ignore it.

Whitehall attributed the apparent success of Argentina in advancing its position within the Falkland Islands Dependencies, and the Soviet Union in proposing a substantial Antarctic program with little prior warning, to political maneuvering. The British scientists were innocents who could not be trusted to keep the proceedings apolitical. In light of the success of other states in obtaining political prestige through a process marked clearly as purely scientific, there was general agreement within the Foreign Office that an official government observer should attend the next organizational meeting in Brussels to ensure British interests were adequately represented. In the words of Ivor Vincent of the Foreign Office:

> the scientists who would make up our own Delegation, and no doubt others as well, would naturally not have prominently in mind the political implications of the arrangements for the International Geophysical Year in the Antarctic. But the delegations of certain other countries would not take such a *purely* scientific view.[40]

The presumption of political innocence was perhaps more local than universal. United States IGY planning bore the fingerprints of Lloyd Berkner, veteran of Richard Byrd's 1927 Antarctic expedition and now a key mover in the highest circles of both science and political administration.[41] Britain had no such man.[42] Before the start of IGY planning the Royal Society had not been significantly involved with Antarctica since losing a bitter power struggle with the Royal Geographical Society over the 1901-04 National Antarctic Expedition.[43] FIDS was run from the Colonial Office with few connections to the wider scientific community. In separating the IGY Antarctic program from both FIDS and the concurrent TAE, which had clear political

[38] Whitehead (26 July 1955).
[39] Vincent (23 August 1955).
[40] Vincent (1 September 1955). Italics added for emphasis.
[41] For an account of Berkner's life and career, see Needell (2000). My thanks to Ron Doel for prompting reflection on the contrasting approaches between the United States and the United Kingdom.
[42] The nearest candidates were Wordie and Brian Roberts. Both held graduate degrees in science and possessed strong government connections, but neither moved in the highest circles of science policy.
[43] On the Royal Society/Royal Geographical Society dispute, see for instance Baughman (1999).

aims, British policymakers presumed a fundamental separation between the two modes of Antarctic engagement that other states did not necessarily share.[44]

While the Royal Society remained Britain's official representatives at CSAGI meetings, the government's inter-departmental Antarctic Committee would now determine the parameters of their actions.[45] The presence at subsequent CSAGI meetings of a Foreign Office observer empowered to act as a puppet-master when required was perceived as necessary given the attitude of other states. The fact scientists were to remain the only on-stage actors confirmed Whitehall's preference for rigid demarcation – extending to the adoption of scientific masks for active participants in the CSAGI meetings – and acknowledgment that political ends would now have to be furthered by scientists as actors, not instruments.

Britain's solution to the problem of radio frequency reporting neatly illustrates how it adapted to the pursuit of political aims in a context dominated by devotion to science. Unable to openly criticize the arrangement on political grounds, as it had been reached by a group of ostentatiously non-partisan scientific experts, the Foreign and Colonial Offices sought to annul it on technical grounds. Vincent was instructed to persuade the Royal Society that British stations reporting to Argentine or Chilean bases was 'undesirable on grounds of scientific efficiency.'[46] A.H. Sheffield of the Colonial Office was sent in a non-official capacity as an expert in radio frequency questions and to 'cover political contingencies.'[47] Sheffield succeeded in being named head of the CSAGI Radio Transmissions Working Group during the Brussels meeting. He quickly reached a solution that satisfied all parties while removing British stations from a hierarchy topped by Argentina, achieving a political aim through deployment of arguments based on practical benefit to the IGY program as a whole.[48] Operating as a non-governmental figure in a technical capacity, Sheffield succeeded admirably in his mission to dispel a threat to British prestige (and potentially sovereignty, as radio frequencies are granted by state authority). The most significant controversy in Whitehall appears to have been whether the Royal Society or the Colonial Office should be responsible for his expenses:[49] evidently the distinction between scientific and political activities extended right through to accounting.

Demarcating a Safe Space

During the final series of pre-IGY CSAGI meetings in 1956, British government attitudes continued to reflect the event's potential dangers. Antarctica was becoming a political minefield in other ways too. Early that year the ship carrying the TAE's eastern party had become trapped in pack ice, temporarily leading to fears of an embarrassing rescue by Argentina (which unlike

[44] Although there were discussions about logistical cooperation between the two ventures, the TAE and the British IGY party remained organizationally distinct.

[45] Vincent (23 August 1955). The broader context of this note was a Chilean government approach to the British government over official coordination of IGY activities, which Vincent rejected on behalf of the Foreign Office by claiming that British IGY planning was entirely in the hands of the Royal Society.

[46] Vincent (1 September 1955).

[47] Willis (27 July 1955).

[48] Anonymous (16 September 1955). The memorandum states not only that Sheffield's nomination was suggested by CSAGI convener Georges Laclavere, but that the results he achieved in the Radio Transmissions Working Group were actively welcomed by the Argentine delegation.

[49] Litchener (28 May 1956). The matter was discussed widely in May 1956 within the Colonial Office.

Britain, owned an icebreaker).[50] Even worse, India's representative at the United Nations – Arthur Lall – circulated a draft memorandum at the UN to make Antarctica 'usable only for peaceful purposes' and explicitly citing the IGY as evidence of international interest in the continent's future.[51] Lall's proposal threatened to replace a power-sharing arrangement between traditional Antarctic powers with a form of global administration, replacing the clubby internationalism of the NBSX with a model that negated colonial-era histories. British UN representatives silenced Lall by bluntly warning of dire consequences for Commonwealth unity if his proposal were taken further, invoking the very bonds that his proposal would weaken.[52]

The major CSAGI planning meeting in Paris, from 30 July to 4 August 1956, featured direct British political representation through Foreign Office observer Ivor Vincent. While Sheffield described it as 'extremely arduous,'[53] the Australian diplomatic observer Murray Bourchier felt 'political content was low and any attempt to introduce political considerations met with the most vigorous condemnation from the Chairman (Colonel Laclavere) and many delegates, especially those of Norway, U.S.A. and U.S.S.R.'[54] Both assessments were true. The rhetoric of scientific devotion dominated official proceedings, while British figures fretted behind the scenes about political challenges.

One incident from the Paris conference perfectly captures the rhetorical hegemony of devotion to science during the meeting. Admiral George Dufek, leader of the US delegation, attended a post-lunch session 'primed with strong drink.'[55] As Bourchier wrote in a confidential report:

> In the course of a long and rambling discourse by the Russians Admiral Dufek (U.S.) who had been put to sleep by it, suddenly woke up and shouted very loudly "what has all this got to do with science?" The American delegation looked embarrassed but nothing more was said, and after a few moments of attentive silence the Russians proceeded with their dissertation, which was in fact exclusively scientific in character.[56]

Dufek's exclamation revealed both the simmering US-Soviet tensions that permeated IGY planning and the manner in which political objectives were expressed within the particular environment of the CSAGI meetings. The admiral's criticism of the Soviet speakers reflected the tools at his disposal; challenging their scientific commitment and intent was the strongest insult possible. British reports of the Dufek incident characterized it as amusing, partly as it occurred during a session of tediously specialized scientific discussion, and because the outburst confirmed the rules of discussion rather than challenging them. Even drunken insults had to be framed in terms of scientific devotion.

The most overt manifestation of political concerns in IGY business came from the Argentine delegate Admiral Rodolfo Panzarini, who provided a golden opportunity for other

[50] United Kingdom Naval Attaché in Buenos Aires (5 January 1956).
[51] For more details on this episode, see Howkins (2007).
[52] United Kingdom delegation to the United Nations (10 May 1956).
[53] Sheffield (14 August 1956).
[54] Bourchier (29 August 1956).
[55] Vincent (3 August 1956).
[56] Bourchier (29 August 1956).

representatives to confirm the discursive order by vigorously punishing a perceived transgression. Panzarini objected to a map of Antarctica used by the French glaciologist Pierre Lejay as it named only one territorial claim – that of France over Adélie Land – and hence constituted a political statement. Laclavere angrily 'bewailed the fact that so many diplomats had invaded a scientific conference,' in the words of Ivor Vincent, after which '[t]he Russian delegate seized this wonderful opportunity to make a speech in favour of scientific pureness of mind and this received approving nods from scientists of all delegations.'[57] Vincent promptly briefed Sir David Brunt to back these sentiments, ensuring Britain conformed to the overarching norms.

The Panzarini-Lejay incident may have focused attention on Argentina's contested sovereignty claims, but Vincent's behind-the-scenes discussions with Chilean and Argentine figures revealed the Soviet Union as a greater threat. The Chilean representative seemed 'scared out his skin by the thought of having Russians in the Drake Passage.'[58] But how could Soviet engagement in the Antarctic be curtailed? The most striking feature of Vincent's confidential report on the Paris meeting is its apparent naivety over the innocence of Soviet delegates. Adhering perfectly to the ideal of devotion to science, the Soviets 'put across an increasingly ambitious programme for their Antarctic expeditions without anyone being in a position to limit them in any way.' Individual Soviet representatives were all ready to chat quite freely on any subject and '[o]ne lady scientist of the delegation was seen all by herself at a party in Versailles.'[59] This accorded with earlier official Soviet announcements on their IGY plans, which stressed the event's international character and the USSR's willingness to contribute to the advance of science, an eminently logical position from the political perspective as the USSR had no territorial claims to safeguard.

Although a Foreign Office/Colonial Office report from the 1955 CSAGI meeting in Brussels described the Soviet delegation as 'politically controlled,' suggesting manipulation of otherwise innocent figures, those sentiments did not appear in Vincent's reports from 1956. What Vincent interpreted as absence of political strategy, driven by the 'scientific fear of getting into politics,' allowed the USSR to plan a substantial IGY program with concomitant prestige.[60] It also meant the USSR could establish a significant Antarctic presence with no guarantee of withdrawal at the end of the IGY: if continuing engagement were justified in terms of scientific results, it could be cast as an expression of devotion to science rather than an act of imperialism.

Indeed, the greatest threat British policymakers saw in the IGY was its potential to evolve from a discrete event to an ongoing engagement, thus permanently altering the continent's political landscape. This began to come true even before the event began when proposals emerged in late 1956 for a one-year extension into 1959. Frank Corner of the New Zealand High Commission in London argued (with little support) for an extension on the grounds that his own nation would thereby have a stronger reason to maintain an Antarctic presence, while an additional year would prevent the Soviet Union claiming its work was not yet complete.[61] Brian Roberts argued that the

[57] Vincent (3 August 1956).
[58] Vincent (3 August 1956).
[59] United Kingdom Chancery in Moscow (25 August 1955).
[60] United Kingdom Foreign Office and Colonial Office (26 September 1955).
[61] Vincent (20 December 1956).

proposal was politically damaging, especially as any IGY prolongation would further efface Britain's historical achievements in the Antarctic, but recognized that rejecting it would be difficult as it would mean 'appearing before the world as not co-operating in the advance of International Science.'[62] Fortunately for the Foreign Office, the Royal Society argued against the proposal on 'purely technical' grounds, citing the desirability of limited data collection accompanied by timely analysis rather than open-ended fieldwork – particularly when non-Antarctic IGY programs had already ceased.[63]

The Paris CSAGI meeting of 1956 was the last to feature substantial British political representation. By the middle of 1957 the heavy organizational work was done and the Foreign Office decided not to send observers to future planning meetings; '[p]olitical observers are … only useful in helping to detect and resist moves made for political reasons. Most of the usual moves of this kind must now have been made, and the Scientists are better aware of the pitfalls.'[64] The Foreign Office felt the Royal Society delegation been educated to the point where they could spot traps like the IGY extension and combat them on scientific grounds, but it is also apparent that IGY organization had reached a point where it was dominated by the how rather than the why of scientific activity. Political crisis management could now shift to other arenas, most notably negotiations over Antarctica's long-term administrative future.

The dominance of the rhetoric of scientific devotion, so powerfully inscribed upon the IGY, ultimately also shaped the articulation of the TAE. The expedition was a major point of controversy within British circles from the first discussions in 1953. Although championed by the Commonwealth Relations Office and the Colonial Office, the Foreign Office harbored serious reservations based on the TAE's dubious prestige value in the face of the IGY. The SPRI Director, Colin Bertram, refused to offer more than personal support for his friend Fuchs.[65] By the middle of 1955 Brian Roberts felt the scale of US IGY plans would destroy the political value of the TAE:

> … the gilt is coming off the gingerbread. The effort will appear rather pathetic in relation to the American (and perhaps Russian) aircraft and ground parties crisscrossing his route. Even the arguments about scientific contributions have worn thin with Dr. Fuchs' refusal to accept any aid from the Americans (dropping fuel and explosives for seismic soundings, etc.)[66]

Once the journey began Fuchs suffered serious delays, culminating in the support party under Edmund Hillary reaching the Pole first – after the United States had established an IGY research station there anyway. Ill-feeling between Fuchs and Hillary damaged the expedition's value as an exercise in Commonwealth solidarity.

But perhaps the strongest testament to the IGY's success in defining science as the key to legitimate Antarctic activity came when Fuchs finally completed the crossing and sent a five-word telegram to Queen Elizabeth II: 'Our scientific work is completed.' A *Daily Telegraph*

[62] Roberts (28 December 1956).
[63] Vincent (11 January 1957).
[64] Hildyard (16 May 1957).
[65] Commonwealth Trans-Antarctic Expedition Committee of Management (10 March 1955).
[66] Roberts (15 July 1955).

editorial (erroneously describing the TAE as part of the British IGY effort) captured the new paradigm:

> They are the first men to make this journey. Yet achievement for its own sake belongs to a past phase of pioneering; the conquest of Everest was perhaps its final landmark. Scientific curiosity is now the spur, and the Commonwealth Trans-Antarctic Expedition was part of a massive and meticulously planned international inquiry. For Dr. FUCHS and his companions, success means that they have secured and duly delivered the data they were sent to seek … [67]

In Britain the imperial explorer was no longer a figure of authority. Far from being a fresh chapter reaffirming Commonwealth vitality, the TAE was an awkward postscript.[68]

Conclusions

Scholars still debate whether the IGY led causally to the Antarctic Treaty, but most concur that its symbolic power made viable a form of administration drawing moral authority from the continent's scientific importance. British political responses to the IGY complicate this picture. On the one hand, the IGY laid a set of 'facts on the ground' through the scale of Soviet and US activity that diminished Britain's position as a leading Antarctic nation. Brian Roberts's fear that historic achievements would be undermined by more recent, large-scale activities came true. Nor did the TAE succeed in reinvigorating British prestige as its backers had hoped. The formal continuation of IGY-based activities that Britain dreaded also occurred, under the aegis of the newly-formed Special Committee for Antarctic Research (set up through the International Council of Scientific Unions).

At the same time, it is important to note that the near-hegemonic rhetoric of devotion to science that marked IGY organizational meetings was a viable political strategy for Britain as well as the United States and the Soviet Union. By establishing IGY activities as apolitical, Britain hoped to minimize its sovereignty implications. This should be seen as a defensive strategy to an unwelcome event. The strategy had limited success, as there were no formal challenges to British sovereignty on account of IGY activities, but removing sovereignty implications from IGY activities could not strip them of prestige value. The main effect of separating science from politics was to remove a potential barrier to massive national projects carried out by the superpowers. Absence of overt political motive actually enhanced their significance by enabling IGY Antarctic activities to be characterized as apolitical contributions to human progress. Like the Space Race, IGY programs in Antarctica exemplified national strength through conspicuous resource consumption in the name of science rather than the territorially-based outlook that dominated British discussions. It is instructive to recall that British figures saw the IGY as a distraction from a definitive administrative agreement over Antarctica rather than a step in the path towards it.

[67] *Daily Telegraph* (3 March 1958).
[68] Dodds has argued, however, that the TAE was a significant event in New Zealand (2005).

The initial hopes of British bureaucrats for an apolitical IGY were doomed: no event on this scale could be apolitical in the age of state-driven science. However, the manner in which British political strategy was pursued during its organization also reflected confusion over the political consequences of scientific activity. The Royal Society might cynically be seen as a front that confirmed British commitment to ideals of scientific devotion while figures such as Vincent and Sheffield manipulated its actions for political ends. Sir David Brunt's autonomy ended when it touched issues of concern to the British government. Yet there was also a genuine feeling, particularly within the Foreign Office, that the *concept* of an apolitical IGY was valid even if circumstances made it a pipe dream.

British political engagement with the organization of the IGY should perhaps, therefore, be seen as a failure because policymakers mistakenly viewed it as a discrete event located in the realm of the international scientific community that could be separated from political consequences. Instead of triumphantly vindicating the power of science over politics, the IGY came to exemplify a new mode of politics through science, one that measured national strength more in terms of prestige than territorial holdings. Rigorously demarcating science from political consequences worked only when those consequences were defined in terms of sovereignty claims. The mere fact of Soviet and American activity at unprecedented levels confirmed the power of those states through the prestige their work generated within a discursive environment that mandated rhetorical devotion to science. These dynamics were subsequently inscribed upon the Antarctic Treaty. This was politics in a new key, not science in the place of politics.

Acknowledgments

Research for this article was made possible by grants from the National Science Foundation (SES-0723925) and the School of Humanities and Sciences, Stanford University. Travel to the 2007 SCAR History Workshop in Columbus, Ohio was made possible by a grant from the Workshop organizers. Thanks to Klaus Dodds, Ron Doel, Aant Elzinga, Lisbeth Lewander, and the members the 2007 SCAR History Group for extensive advice and comments.

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POLAR INTERNATIONALISM, DIPLOMACY, AND THE INTERNATIONAL GEOPHYSICAL YEAR

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Abstract

The International Geophysical Year (IGY) of 1957-58 is widely believed to have inspired and facilitated the 1959 Antarctic Treaty, which partly resolved or at least postponed a cluster of political conflicts over Antarctica. But when the history of the idea of internationalizing Antarctica is surveyed, especially in its later phases, the causal connections between the IGY and the Treaty are revealed as far from simple.

The internationalization of polar regions was mooted by jurists and others from the early 20th century onwards. Then in the late 1940s a trend in US public opinion coincided with an official policy review, and two versions of internationalization were suggested for Antarctica by the US State Department. The available but circumstantial evidence suggests that the 1950 proposal for a Third Polar Year was triggered by that conjuncture at least as much as by scientific motives. If so, then while science in the form of the IGY may have assisted diplomacy in the late 1950s, ten years beforehand diplomacy had already done much to advance the cause of international science in Antarctica.

Formulating the Idea, 1907-1939

The Antarctic Treaty may be 50 years old in December 2009, but the *idea* of it will be roughly twice that age. Whatever science contributed to the Treaty later on, it did not have very much to do with the original conception. True, several scientific expeditions to Antarctica in the 19th and early 20th centuries had international elements. In particular, a cluster of expeditions around the turn of the century were partly aimed at supplementing the modest sub-Antarctic portions of the International Polar Year of 1882-83, but they seldom synchronized or otherwise coordinated their observations. This relatively internationalist period was followed by a more nationalistic phase, which included the British claim to the Antarctic Peninsula and neighbouring territory, formulated in 1908 and refined into an explicit polar sector in 1917, and the competition between Scott and Amundsen to be the first to reach the South Pole, played out from 1910 to 1912. If the scientists had established a permanent international coordinating body for polar research in general or Antarctic research in particular, they might have had some quiet influence on political developments. But in the end their national perspectives, loyalties and paymasters prevented this.

The International Polar Commission which had directed the first Polar Year of 1882-83 was reorganized in April 1884. But it took no new initiatives and did not reconvene for seven years, when it took just 90 minutes on the morning of 3 September 1891 to dissolve itself (*Mittheilungen*, 1882-91, pts 6 & 7). Thirteen years later Henryk Arctowski (1871-1958) proposed to the 8th International Geographical Congress (IGC), meeting in the United States, that a similar international scientific programme should be mounted, primarily in Antarctica. In a fuller account of his ideas he explained that this would amount to a second Polar Year, to be held 25 years after the first (*Arctowski*, 1904,

1905). Then in September 1905 the London *Times* reported in sceptical tones that during the International Congress for World Economic Expansion at Mons a section devoted to "Expansion of Civilization in New Countries" had passed a resolution proposing a new international body for polar research, to be supported by the Belgian government.[1] A provisional scientific commission convened the following year, and again in 1908. The group seems not to have approached the International Meteorological Organization, which had sponsored the first Polar Year, and they received only lukewarm endorsements from the IGC. It took over seven years before a fully functional International Polar Commission, supported by only half the 22 eligible countries,[2] was formally constituted during the 10th IGC, held at Rome in April 1913. Its members were advised that their first meeting would be held at St Petersburg in 1916. But the death of their chairman, the Russian geologist Feodosii Chernyshev (1856-1914), in January 1914 and the outbreak of war in Europe later that year effectively put an end to the project (*Elzinga*, 2004).[3]

The story of the 1959 Antarctic Treaty does begin in the early years of the 20th century, but not with science and not in the Antarctic. The Spitsbergen 'coal rush' started with small-scale Norwegian operations in the late 1890s and accelerated with British and American investments after 1900. After an exchange of diplomatic notes between Sweden and Russia in 1871, an understanding had existed to the effect that the Spitsbergen or Svalbard Archipelago, located about 700 km away from the European mainland, should be regarded as without sovereignty, or *terra nullius*. But with the advent of year-round economic activity in permanent settlements such as Longyear City, the continuation of anarchy was no longer feasible. Furthermore, after achieving full independence from Sweden in 1905 the Norwegian government had renewed its interest in the resources of the archipelago. In 1908 it invited other interested governments to attend a conference on the matter in 1910. Despite difficulties posed by the Swedish and Russian governments a convention on internationalization was drafted in 1912. But the plenary conference did not meet until June 1914, and had to be suspended during the First World War. Then under the Svalbard Treaty of 9 February 1920 Norwegian sole sovereignty over the archipelago was recognized with important qualifications.[4] All citizens of states party to the treaty were to have equal rights of access and economic activity; taxes could only be raised for and spent on local administration; and Norway accepted restrictions on its military activity in the archipelago.

Well before it was resolved, the issue of Spitsbergen began to resonate in legal circles. In 1907 the editor of a London law journal toyed with the idea that a good solution might be the instalment of an independent scientific commission as rulers of Spitsbergen.[5] Then the French jurist and diplomat René Dollot (1875-1962) published two influential articles (under a pseudonym) about sovereignty in Polar Regions (*Waultrin*, 1908, 1909). He mentioned, but did not support, the idea that Spitsbergen's sovereignty might be shared in a condominium (1908: 121). In 1910 however Thomas

1 *The Times*, 27 September 1905, p. 5. In the paper's opinion, the role allotted to the Belgian government was "not, perhaps, calculated to inspire unlimited confidence".

2 Britain, France, Germany and Norway were amongst the absentees.

3 Elzinga (*loc. cit.*) argues that this IPC was continued by the World Meteorological Network after 1918. There was of course a cultural continuity, embodied in people like Arctowski and La Cour, but the present author is not persuaded that the IPC was continued *as an organization*.

4 A proposal from the Netherlands, that Spitsbergen should become a League of Nations mandate, presumably to Norway, was not successful.

5 *The Law Magazine and Review*, 1907, (33) p. 85.

Willing Balch (1866-1927) welcomed Norway's apparent intention to preserve Spitsbergen as „a joint possession of all mankind". (Although that was not how things eventually turned out, as we have seen, he was quite right at the time.[6]) And he went on to propose that "both East and West Antarctica" should be internationalized in the same way (*Balch T.*, 1910: 275).[7] To the author's knowledge, he was the first person ever to do so.

Dollot (above) also discussed whether sovereignty could be exercised over frozen seas, or whether they should simply be subject to maritime law.[8] The question had arisen from a speech made by the Canadian Senator Pascal Poirier (1852-1933) on 19 February 1907, which Dollot quoted at length. Attributing the idea to a recent discussion between Canadian and American explorers at the Arctic Club in New York, Poirier had declared that Canada (and every other country bordering the Arctic Ocean) had a right to claim any new land found in the seas to its north between lines (meridians) defined by the north-western and north-eastern points of its existing territory.[9] To a jurist, however, the problem was to understand why the Arctic Ocean should be treated differently from other oceans, in which sovereignty over islands could not be claimed hypothetically and beforehand, but only after they had been discovered, occupied and officially administered. Was the Arctic Ocean an exception because its frozen waters constituted a land-like surface on which people could live, travel, and engage in economic activities? (A sort of *aqua firma* – RB.) But did not ships also sail through it? Poirier claimed only Arctic lands for Canada, but the question of sovereignty over ice has been debated by jurists ever since (*Pharand*, 1969; *Rothwell*, 1996: 261-68). In his early papers Dollot concluded cautiously that the law would depend on whatever science might determine about how stable and stationary the ice of the Arctic Ocean really was (*Waultrin*, 1909: 655-56).

The significance for the internationalization of Antarctica was that those who thought it legitimate for states to claim some sort of rights or title over the frozen wastes of the Arctic Ocean, and not just over its islands, sometimes went on to assimilate the two polar regions for legal and political purposes.[10] This was not an option for those who differentiated legally and in other ways between a broadly maritime Arctic Ocean and a – probably – continental Antarctica. During the 20th century no states adopted an undifferentiated approach covering both polar regions, though Britain at least toyed with one when it transferred Senator Poirier's sectoral doctrine from the Canadian Arctic to the

6 For the intentions of the Norwegian and Swedish governments to that effect, despite their shaky conceptions of the notion of *terra nullius*, see (*Jacobsson*, 2004).

7 T. W. Balch was a son of Thomas Balch (1821-77), an authority on the international law of arbitration, and he made the continuation of his father's work his own. His elder brother Edwin Balch (1856-1927) was a historian of Antarctic exploration, and T. W. Balch took care to follow his brother's preferred nomenclature for the region (*Balch, E. S.*, 1902). On 9 March 1912, while commenting on Amundsen's success in reaching the South Pole, the *New York Times* expressed approval for T. W. Balch's idea under the sub-head "Plan of International Possession" (p. 6).

8 In several European languages the Arctic Ocean was called the 'Frozen Ocean' or 'Ice Ocean', which perhaps gave the impression that its ice surface was an unbroken and permanent natural structure.

9 The first appearance of the sector theory in print may have been on a visiting card designed by the Canadian explorer Joseph-Elzéar Bernier (1852-1934) in about 1901, which showed a sector reaching to the North Pole between the meridians of 141 and 60 W (*Dorion-Robitaille*, c 1978: 30). In 1904 the Canadian government published a map to the same effect (*Timtchenko*, 1997), but it did not become (semi-)official Canadian policy until the 1920s. Poirot's speech is often dated as 20 February, but from Dollot's slightly confusing citation it appears that it was given on the 19th and published on the following day in the *Comptes rendus du Sénat*.

10 Some Soviet jurists accepted the territoriality of Arctic ice, but tended to differentiate between the two regions as strongly as colleagues who did not (*Taracouzio*, 1938: 348-51).

Antarctic Peninsula almost before that gentleman had finished speaking.

Between 1898 and 1914 the eminent French jurist Paul Fauchille (1858-1926) prepared six posthumous editions of Henry Bonfils' (1835-97) *Manuel de droit international public*. At first Fauchille differentiated between the polar regions – unclaimable water in the Arctic, claimable land in the Antarctic (*Bonfils*, 1912: 361); he repeated that opinion in the 1914 edition. But eleven years later, in a final revision published under his name, he took the opposite position. His new, assimilative conclusion was that stable ice *could* in some sense be appropriated, and that all states were entitled to share in any benefits to be derived from both polar regions, though perhaps some more than others (*Fauchille*, 1925: 706-708). Refining T. W. Balch's proposal, he suggested that the polar regions could be managed on a collective legal basis as "une sorte de condominium plural" (*Fauchille*, 1925: 658). But he stopped short of proposing the newly-created League of Nations, to which he had served as a delegate, for this role.

During the 1920s the governments of Australia, Britain, France, and New Zealand all concerned themselves with Antarctica in various ways, as too did the proliferating whale factory ships of Norway and other countries. Public opinion was slow to respond until Richard Byrd's (1888-1957) first expedition arrived in Antarctica at the end of December 1928. A few weeks later the long-range weather forecaster Herbert Browne (1862-1936) wrote to the *New York Times* with the first known proposal that Antarctica should become "a trust for the nations of the world ¼ *under the League of Nations*".[11] Within 14 months his idea was repeated at least three times from both sides of the Atlantic and of the political spectrum.[12] It would continue to be aired throughout the 1930s.[13]

In December 1930 the editor of *Foreign Affairs*, Hamilton Armstrong (1893-1973), asked the State Department's Geographer Samuel Boggs (1889-1954) for an article about Antarctica.[14] Armstrong too was doubtless responding to Byrd's first expedition. He may also have known that Boggs had recently written a departmental memorandum on US policy options for Antarctica (*Quigg*, 1983: 129). Boggs replied that it was an inappropriate time for such a public article from him because circumstances were changing. (He may understandably have been hoping for an early determination of US policy, which did not eventuate.) But in September 1933 he completed a substantial monograph on the issues surrounding claims to sovereignty in polar regions (first published 36 years after his death). In it he proposed that all countries should be entitled to place „temporary or permanent" scientific stations anywhere in Antarctica regardless of territorial claims, and that the question of Antarctic sovereignty should receive a multi-national solution along the lines of Spitsbergen (*Boggs*, 1990: 114-15, 123). The first point may have been new; the second was an indifferently worded restatement of the views expressed by T. W. Balch 23 years earlier.

11 *New York Times*, 16 February 1929, p. 10, emphasis added; the letter was dated 13 February.

12 *The Living Age* (Boston), vol. 336 #4340, April 1929; Vladimir Karapetoff (1896-1948), letter, *The Nation* (New York), vol. 130 # 3369, 21 January 1930; "The Grab for Antarctica", *Week-end Review* (London), vol. 1 # 7, 26 April 1930. A resolution along the lines of the Svalbard Treaty, with Britain taking the role of sovereign custodian of Antarctica, was also proposed at this time: L. H. Martin "Land Claims in Antarctica Come to the Fore", *New York Times*, 5 January 1930, p. XX5.

13 Thus the statement that, as of July 1939, "Internationalisation schemes had not yet been proposed" (Moore, 2004: 20) can only be sustained by inserting the word 'officially'.

14 Armstrong-Boggs, 16 December 1930: Papers of Samuel Whittemore Boggs, US Library of Congress, [1] \State Department A-B/.

(Indifferently, because while Spitsbergen had seemed likely to be internationalized back in 1910, by 1933 it was an integral part of Norway with certain international obligations but no sharing of its sovereignty or administration.)

In 1932 the French geographer Camille Vallaux (1870-1945) published an article about territorial claims to polar regions in which he argued that they should, or might, give way to internationalization (*Vallaux*, 1932). And in 1934 Jesse Reeves (1872-1942), a jurist and professor of political science at the University of Michigan, concluded that the "essentially international" nature of Antarctica should be recognized by international agreement (*Reeves*, 1934: 119).

The following year saw an unusual intervention from a semi-official quarter. Frank Debenham (1885-1963) was an Australian geologist who took part in Robert Scott's (1868-1912) last expedition to Antarctica. In 1921 he became the first director of the Scott Polar Research Institute (SPRI) in Cambridge, England, which had close ties to the Foreign Office; in 1928 he was executive secretary to the 12th IGC at Cambridge, which had no polar meetings;[15] and in 1931 he was appointed Cambridge's first Professor of Geography. In September 1935 he addressed the British Association for the Advancement of Science, meeting at Norwich, on "Some Aspects of the Polar Regions". His lecture was framed as a set of harmless fantasies, running from futuristic wind-farms in Antarctica, which might somehow beam their power to the rest of the world "when coal is scarce and oil exhausted", to a possible sanatorium on Spitsbergen. Along the way Debenham paused to consider the unsatisfactory political situation in Antarctica:

> "It is probably too late for any alternative arrangement to be adopted, but had there been a League of Nations in existence at the beginning of this century, before any claims had been laid in the Antarctic, the protection and administration of this last and least useful continent would have been a most appropriate subject for League administration as an 'international park' of vast proportions which should be open to all nations who would respect its amenities.
>
> Political might-have-beens, however, are no more useful than social ones, and claims to territory, which can do little beyond giving a large splash of colour on the map, are bound to continue."[16]

It was an anodyne but effective way to shrug off a proposal which did not accord with British imperial policy.

The proposal, however, persisted. In 1937 the *Christian Century*, widely regarded as "liberal protestantism's most influential weekly" (*Addison*, 2004: 85), endorsed it with an editorial.[17] And in 1939 the British Fabian lawyer Thomas McKitterick seemed to accept Britain's title to the Antarctic Peninsula, but then suggested, in assimilative vein, that all polar territories should "be put permanently outside the sphere of colonial acquisition ¼ and ¼ governed by an international commission" (*McKitterick*, 1939: 96-97).

Back in January 1934 the Norwegian government, responding to Britain's recent annexation of the vast Australian Antarctic Territory, had withdrawn a previous expression of interest in multilateral negotiations about the future of Antarctica, in favour of further bilateral exchanges (*Bush*, 1982 (2):

15 Apart from a social gathering at SPRI.
16 *The Times*, 6 September 1935, p. 6.
17 „Conflicting Claims to Antarctica", *Christian Century*, 23 June 1937, (54) 796-797.

150). International negotiations do not amount to negotiated internationalization, which was not proposed by Norway at that time. But in 1938, with diplomatic exchanges making little progress, the Norwegian Ministry of Trade directed its Svalbard and Arctic Ocean Survey to prepare an International Polar Exhibition that should open in Bergen in May 1940 (*Anon.*, 1945). An international conference of polar explorers was to have been an important part of the event. Norwegian officials stressed that the claims issue was not on the conference agenda, but less than two weeks before the German invasion of Poland the *Manchester Guardian* still cherished the hope that the meeting would reconcile the overlapping Antarctic interests of Argentina, Britain, Chile, Germany, Norway and the United States.[18] Prevented by the outbreak of war, the might-have-been Bergen conference has been called "a lost opportunity for the then still unborn Antarctic community of nations" by one historian (*Berguño*, 2000: 97).

A final point about the 1930s is that anyone contemplating an international arrangement for Antarctica may have derived some modest encouragement from the admittedly slow progress being made with creating one for the related business of whaling. Conferences convened by the League of Nations at Berlin in 1930 and by Norway and Britain at London in 1937 resulted in a protocol which banned the killing of all right and gray whales.

Approaching the United Nations, 1940-1947

Early in 1940 the proposal to internationalize Antarctica acquired something it had lacked for 30 years – a sympathetic organization, namely, the Women's International League for Peace and Freedom (WILPF). On 31 March the *New York Times* published a letter from the veteran peace campaigner and social activist Emily Greene Balch (1867-1961).[19] E. G. Balch had played a leading role in founding the Women's International League after the First World War, and had been honorary president of its international section since 1937. In her letter she noted with approval that "the possibility of a solution [to postwar colonial questions] by creating some sort of international status for all places where independent self-government is not yet practicable has been considerably discussed here and even more in England". She proposed, by way of a pilot project, that instead of making its own territorial claim in Antarctica the United States should advocate the "international administration" of "polar regions" by "a consortium of all, a world trust". Her assimilative explanation, that this would be possible because both polar regions had "no populations ¼, no vested rights, no history", suggests that she may have been influenced by Fauchille, whose *Traité* was published while she was working for WILPF at Geneva after the First World War.[20]

The war did not put an end to the efforts of the Women's International League. From its office in New York it distributed a mimeographed newsletter to its supporters and to such allied decision-

18 *New York Times*, 27 July 1939, p. 7; *Manchester Guardian*, 18 August 1939, p. 8.

19 E. G. Balch and T. W. Balch were not related in the usual sense of the word, having no common male ancestor closer than medieval Somerset. However they shared not just a surname, but an interest in international law and arbitration and a habit of writing letters to *The Nation*. They surely knew of each other's existence.

20 E. G. Balch's ideas about polar regions were coloured by her support for the creation of an international maritime authority, a proposal that she espoused in 1924 and on which she may also have consulted Fauchille (*Randall*, 1964: 373-75). Living by that time just outside her native Boston, she is likely to have seen some or all of the earlier pieces in *The Living Age*, the *New York Times*, *The Nation* and *Christian Century* that were cited in the previous section.

makers as could be reached. As the war was drawing to its close and attention was starting to focus on the world order which should follow it, Balch repeated her proposal in that organ (*Balch, E. G.*, 1945).

To the author's knowledge, no one else found time to advocate the internationalization of Antarctica while their country was taking part in the Second World War.[21] A suggestion that it was mooted by New Zealand's then Deputy Prime Minister Walter Nash (1882-1968) at a press conference on the Canberra Agreement in January 1944 is not confirmed in the reports by journalists who attended.[22] Within three years, however, much would change.

Two developments in 1946 reawakened political concerns about Antarctica. First, the conflict between Britain, Chile and Argentina, over their rival claims to sovereignty in the Antarctic Peninsula and neighbouring islands, was predictably revived and intensified as a result of Britain's installation of permanent stations in the area by means of the wartime *Operation Tabarin*. And second, a captured German Antarctic whaling flotilla, which had been assigned to the Soviet Union by the Tripartite Maritime Commission in December 1945, was finally handed over to its new owners (after 15 months in British hands) on 26 September 1946. The Russians, in short, were coming.

One response to these events was the US Navy's large-scale Antarctic reconnaissance, training and flag-showing exercise, *Operation High Jump*, which was conceived in mid-1946 and carried out in the austral summer of 1946-47. Other responses were more pacific.

By November 1946 the US Department of State had formed the opinion that the best option for Antarctica was some form of UN trusteeship. The Department of Defense was not immediately persuaded, and the lack of consensus led to a further policy review intended to weigh the submission of a new American claim and all other claims to the United Nations alongside other options (*Moore*, 1999: 198).[23] Much of the publicity and public support for internationalization over the next twelve months may have been a by-product of internal policy debates in Washington. However that does not negate the possible influence of such a climate of opinion on scientific circles.

An editorial in the liberal *New Republic* in November 1946 was an early straw in the wind. Commenting on rumours of a possible 'uranium rush' in Antarctica, the magazine suggested that a United Nations trusteeship would be preferable, and continued: "one member of the [UN] Secretariat's Department of Trusteeship thinks it would be a 'good idea'. The time has come for the Secretariat to take the initiative."[24] A few days later the *Washington Post* also suggested that the

21 Gidel (1951: 132) cited an editorial in the London *Daily Herald* on 7 January 1942, but no such item was found on that date, nor in an extensive search of other wartime issues of the paper.

22 Unfortunately Dollot (1949: 189) gave no reference for his statement that New Zealand favoured a UN solution for Antarctica as early as 1944. He and others may have been misled by (*Johnstone*, 1944) which perhaps first smuggled the word 'Antarctic' into a purported analysis of the Canberra Agreement, a document that had never mentioned the place.

23 See also *New York Times,* 6 January 1947, p. 21. While ceding no particle of the British claim, even *The Times* deposed that "Antarctica is not a fit subject for national rivalries or political bargaining" – 11 January 1947.

24 *New Republic*, 25 November 1946.

United Nations should play a role.[25] At the other end of the world, the New Zealand Cabinet had privately reached the same conclusion by Christmas Eve (*Templeton*, 2000: 89).[26]

In March 1947 the *Washington Post* polled local residents and found that 66% were in favour of a UN trusteeship and 23% opposed it. Whatever its methodology, the results suggest that in the late 1940s American public opinion may not have been quite so neglected by policy-makers who favoured internationalization, nor *a fortiori* quite so "negligible", as has been thought.[27] In April the *New York Times* also took up the cry.[28]

In May 1947 the executive committee of the Women's International League, meeting in Geneva, decided to take up its international president's idea and propose to the United Nations that trusteeships should be created for the Arctic and the Antarctic. In August and September this was supported by WILPF branches in Denmark and Finland.[29] The submissions from Scandinavians who should perhaps have known better repeated the assimilation of the Arctic with the Antarctic as equally "uninhabited", "unappropriated and masterless" areas, which had marred E. G. Balch's original conception.
Meanwhile in June 1947 a second, perhaps more influential, citizens' group, the American Association for the United Nations, had published a report calling for "the creation of an international regime for the Antarctic Continent, to be administered directly by the United Nations".[30]

In October 1947 the Trusteeship Council placed the WILPF petitions on the agenda for its second session;[31] on 11 December 1947, with its chairman Francis Sayre (1885-1972) presiding, it rejected them.[32] Its grounds were later said to have been that the creation of such regimes was outside its competence (*Hanessian*, 1960: 449). Since six UN member states – Canada, Denmark, Finland, Norway, the Soviet Union, and the United States – were governing the affairs of large indigenous and settler populations in the Arctic without appealing for help from the United Nations, the

25 Editorial, *Washington Post*, 3 December 1946, p. 8; see also 2 January 1947, p. 6.

26 See also *New York Herald Tribune*, 29 December 1946. Early New Zealand thinking about UN-based internationalization was not confined to, and sometimes explicitly rejected, the trusteeship option (*Templeton*, 2000: 138-140).

27 (*Moore*, 1999: 125); see also (*Moore*, 2004) for a fuller exposition of the interpretation that Antarctic non-claimancy and internationalism were unpublicized and unpopular in the postwar United States, and that nationalism prevailed not only in the column-inches of hero-worship devoted to Admiral Byrd but also with actual public opinion.

28 Editorial, 16 April 1947, p. 24. Laurence Gould (1948: 110) cited an unpublished "careful and exhaustive study" of the legal issues, completed by Richard Young of the Harvard University Law School in May 1947, which had also come down in favour of UN control.

29 The petitions were sent to the Secretary-General and passed by him to the Trusteeship Council. The three petitions from Denmark and one from Finland were identically worded.

30 Fifth report of the Commission to Study the Organization of the Peace, chairman James T. Shotwell, summarized in *Washington Post*, 12 June 1947, p. 7.

31 UN Trusteeship Council T/PET/GENERAL 15, 16 & 18, 4 & 9 October 1947.

32 *New York Times*, 12 December 1947, p. 14. Sayre's practice at the Trusteeship Council was to transfer his functions as a US delegate to his alternate and then to chair the proceedings as impartially as possible. Throughout his life he stood by the principles of his first father-in-law, President Woodrow Wilson. And in 1919 he had been encouraged by the example of Spitsbergen to hope for great things from the future League of Nations (*Sayre*, 1919: 92-97).

difficulties facing an assimilative, 'bi-polar' proposition were probably insurmountable (*Beck*, 1986: 271). But surprisingly, that was not the end of the matter.

In 1948 the long-drawn-out US policy-making process produced an outcome that will be summarized below. There is no record of Francis Sayre having taken part. He was a distinguished diplomat who had served his country in Thailand and the Philippines before seeking a UN appointment and reverting to his early interest in international administration as the first president of the Trusteeship Council. But in 1948, while still in that post, he took the unusual step of publishing an article in the *American Journal of International Law* in which he explained that, unlike the League of Nations mandate system, there would appear to be no legal barriers to setting up an Arctic and an Antarctic Trusteeship under the United Nations, just as the WILPF petitions had urged (*Sayre*, 1948: 265-66). That was also the view taken, less publicly, by the State Department.[33]

Sayre's apparent dissent from the Council's decision can be explained in several ways. He may have agreed with the substance of the petitions but not their form. The main WILPF petition had been an idealistic shopping list, calling not only for polar trusteeships but also for progress on disarmament, UN control of aviation and the oceans, and more appointments for women as UN officials. And the supporting petitions had asked only for a study of the polar trusteeships idea, not for actual trusteeships. Furthermore, as Sayre pointed out, the Trusteeship Council was obliged to implement the wishes of the governments themselves and not some agenda of its own. But his choice of words leaves open the possibility that his dissent was real. He had been a supporter of international administration in appropriate circumstances for 30 years, and was a well-known worshipper of the League (*Kuehl & Dunn*, 1997: 143). Now his government, or at least department, had finally found something that it wished to internationalize. So he may well have been the unnamed UN official quoted by the *New Republic* in November 1946 as favouring a trusteeship for Antarctica. But even if he was, he could never have secured approval for the poorly drafted WILPF petitions against the political barrier represented by the presence of four Antarctic claimant states (Australia, Britain, France and New Zealand) on the Trusteeship Council.

But the most extraordinary thing about Sayre's article was not that he felt the need to write it, nor that, in those more deferential and less information-thirsty days, the American and international press paid no attention to the apparent U-turn that it represented. It was, rather, the extent to which it was ignored in the professional literature of the day. It was probably published too late to be discussed by Dollot (1949). But that was no excuse for Mouton (1962), or for Hayton (1956) and Hanessian (1960), both of whom mentioned the UN petitions. Before the internet, bibliographies depended largely on citations by scholars of further work by their colleagues. The effectiveness of the tacit boycott that surrounded Sayre's article is evidenced by its – doubtless inadvertent – omission from one of the most comprehensive bibliographies of the period (*da Costa*, 1958).

Of necessity, this chronicle of the idea that Antarctica should be placed under international administration has been limited to scanty printed vestiges from a handful of countries. Had the author been equipped to access Scandinavian sources, more examples might have been found. As far as it goes, the narrative suggests that Antarctic internationalization remained a minor matter for all

33 FRUS 1948, (1) 981.

concerned, and made only slow progress with public opinion between April 1910 and the end of 1947. Keeping it just about in the public domain appears to have been the achievement of a small number of Christian internationalists, most but not all of whom were Americans inspired in part by their country's anti-colonial traditions. Significantly, some of them were or had access to decision-makers. At the end of the 1940s their perseverance was rewarded when leading American newspapers, prompted by the chauvinist territorialism surrounding *Operation High Jump*, endorsed the idea of internationalization. (Whether or not they were also briefed by State Department officials will probably never be known.) When the president of the UN Trusteeship Council himself accepted that internationalization was a valid option, whether for reasons of state (below) or reasons of law, its time appeared to have come.

Science as Co-Opted Ancillary, 1947-1950

Immediately after the Second World War the State Department may have shared the view of the British Foreign Office (and the Royal Navy) that an international settlement in Antarctica was undesirable because non-claimant countries, especially the Soviet Union, would insist on participating.[34] But the rise of tensions in the region during 1946 and 1947 prompted a policy review which eventually recommended that the United States should first issue a formal claim to all areas to which it was thought to have some title, based on extensive exploration over the previous 110 years, and then quickly lead a joint application to the United Nations for a trusteeship over the whole of Antarctica by the eight claimant countries – Argentina, Australia, Britain, Chile, France, New Zealand, Norway, and the United States. (It is worth noting that the Truman Administration tended to see the UN trusteeship system as instrumental to US national interests, for example in respect of the Pacific island groups which it had recently conquered from Japan.) The problems of an (unprecedented) eight-power administration were played down.[35]

As hinted at by phrases like "special trusteeship", the State Department was never committed to handing Antarctica over to the United Nations unconditionally and outright.[36] But when the Department of Defense joined the British Foreign Office in the objection that no UN-based arrangement could exclude the Soviet Union, the policy was modified by including the option of creating an autonomous eight-power condominium that would not be answerable to the UN in any way.[37] Phrases such as "international administration" and "special regime" were used for this arrangement.[38] Whether national claims were to be renounced or merely suspended was left unclear. By July 1948 the Secretary of State was confident that the revised policy would deny to our most probable enemies participation in the control of all or any areas in Antarctica.[39]

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34 FRUS 1946 (1) 1492-93.

35 FRUS 1948 (1) 981.

36 FRUS 1948 (1) 962.

37 Joint Chiefs of Staff - Sec Defense, 19 March 1948, plus attached Proposed Letter for Sec Defense to Sec State; also Lt Col R. B. Simpson, Mem Rec 'Antarctic Policy Developments', n.d. but c April/May 1948: all at USNA, RG 330, Sub/Num Files 1947-1953, Entry 341, [23], \Antarctic – US Policy/. See also: Sec Interior - Act Sec State, 8 January 1948, and Sec State - US Emb London, 4 March 1948: both in FRUS 1948, (1) 962, 965-66.

38 See for example: FRUS 1948, (1) 997; also Draft Agreement on Antarctica, 22 March 1948: USNA, RG59, Decimal File 1945-49, 800.014 Antarctic, [4083].

39 Marshall - Forrestal, 9 July 1948: USNA, RG330, OSD CD 27-1-9, NND 790030, Entry 199, [120].

The American plan was discussed with British diplomats at the end of 1947 and in the first part of 1948. A Draft Agreement was circulated to the other claimant states for comment in June and then more formally, as US policy, in August 1948. Most were not impressed. Chile and Argentina dismissed the idea of internationalization as "unacceptable"; Australia described its right to Antarctic territory as "unchallenged" and "had never thought of the necessity for an international administration"; Norway considered the American scheme "unnecessary"; and France delayed its response in the not unfounded hope that nothing would ever come of the matter.[40] Although Britain was initially quite positive, and tried to persuade Australia and New Zealand, a State Department official confessed to a British diplomat, in March 1949, that the overall response had been preponderantly negative.[41]

By mid-1948 American officials were therefore searching hard for arguments that might persuade the claimant nations to abandon long-established policies. After all, five of the seven already recognized each other's claims. All would have been content for the United States to join them by claiming the unclaimed sector in Western Antarctica which had long been informally reserved for that purpose.[42] And by the end of the year the parties to the most intense territorial dispute, Argentina, Britain and Chile, had opened negotiations that would lead to them limiting their naval deployments in the Antarctic. For a time it probably seemed that conflict avoidance could be achieved without disturbing the status quo.

What was needed was a new positive incentive. Ideally, as one independent commentator expressed it that year, a programme of work should be internationally agreed and then carried out either severally or collectively (*Gidel*, 1951: 136).[43] But what sort of work? In April 1948 the US Secretary of Defense James Forrestal (1892-1949) admitted that the future strategic value [of Antarctica] ¼ to the United States or to our most probable enemies cannot be accurately predicted at this time in view of the dearth of information concerning the region, but added that on present knowledge the chief value of the Antarctic is in scientific and meteorological fields, both of which have very great military import.[44] In July the State Department's Geographer Samuel Boggs repeated the point less bluntly in a version of the Draft Agreement on Antarctica. In his words "scientific data that may be obtained only in the Antarctic regions are urgently needed" and therefore "facilitation of comprehensive scientific exploration ¼ is of prime importance". The eight-power regime would set up an administrative commission empowered to "draw up an overall plan of exploration, investigation and scientific and technical development".[45] The example of the Norwegian-British-Swedish Expedition, still in preparation at the time, may have encouraged this approach.[46]

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40 FRUS 1948, (1) 995, 1003, 1009, 1011-13; 1949, (1) 793-795.

41Mem, Con, Hulley & C.A.G. Meade (British Embassy), 23 March 1949: FRUS 1949, (1) 795. New Zealand's problem seems to have been that it would have preferred a UN trusteeship, and was less attracted by the condominium option which replaced it.

42 The United States, however, was developing a non-sectoral and non-continuous claim. See for example the map of "Territorial Claims in Antarctic" prepared by the CIA in October 1947: USNA, RG330, OSD CD 27-1-9, NND 790030, Entry 199, [120]. To the extent that this became known to the other claimants, it made them even less inclined to support the new American proposals.

43 Originally published in 1948.

44 FRUS 1948, (1) 972.

45 'Draft Agreement', note 38 above.

46 The NBS expedition included citizens of Australia and Canada as well as the sponsoring countries; offers of personnel from South Africa and the United States were not taken up.

In line with this strand of policy-making, the State Department approached the US National Academy of Sciences in July 1948 with a request for its advice "as to the nature and scope of scientific operations that are feasible in the Antarctic".[47] The Academy held a preliminary meeting on 26 July and a fuller conference on 27 September, on the basis of which it submitted a final report in May 1949.[48] As Samuel Boggs told the Academy scientists when thanking them in September 1948, "The real purpose ¼ was to get advice as to what ¼ would be done best on an international basis. To that extent the [meetings] have done a great deal and it is now possible to say that we have already been talking with the top scientists in this country". The admission that political plausibility was a consideration would not have been lost on his audience.[49]

One of the first people invited to take part by Academy president Alfred Richards (1876-1966) was the ionospheric physicist Lloyd Berkner (1905-67) at the Carnegie Institute of Washington's Department of Terrestrial Magnetism. In 1928-29 Berkner had joined Richard Byrd's first Antarctic expedition as pilot, radio engineer and radio scientist; in 1936 he became secretary of an international Mixed Commission on the Ionosphere; in 1946-47 he served as executive secretary of the Joint [Army and Navy] Research and Development Board (JRDB) while the armed services were being brought together to form the new Department of Defense (*Needell*, 2000: 19-31, 59-60, 109-18).

Formal papers to the Academy's conference were discouraged, but Berkner (alone) produced one nonetheless. In it he set out a long wish-list of geophysical measurements, including the extension of the existing international network of ionospheric recorders into the Antarctic, and stated that a scientific expedition would need about three years to prepare, including two for the acquisition of apparatus and training of observers.[50]

Three months before Under Secretary Lovell's invitation to the Academy, however, Antarctic diplomacy had taken a novel turn. On 7 April 1948 the Chilean Antarctic Commission met for only the ninth time since its formation in 1906. One of its members was Julio Escudero Guzmán (1903–84), a professor of international law who had helped to delimit his country's Antarctic claim in 1940, and had later served on the trusteeships committee of the United Nations founding conference at San Francisco.[51] In the course of a general discussion about how best to respond to the diplomatic initiatives coming from the United States, Escudero proposed to the Commission that Chile should

47 R. A. Lovett, Under Secretary of State, letter to A. N. Richards, president of the National Academy of Science, 9 July 1948: Archives of the National Academies of Science, Central Policy Files, 1946-1949, \Committee on Antarctic Research: 1949; 1948/.

48 The State Department supplied the agenda for the preliminary meeting and paid the costs of both, about $3,300 – Memo 27 July 1948: USNA, RG59, Decimal File 1945-49, 800.014 Antarctic, [4083].

49 Richards - Boggs, 21 July 1948; Minutes of Preliminary Meeting, 26 July 1948; Minutes of Conference, 27 September 1948: both at NAS-NRC Central Files. NAS report, „Antarctic Research: Elements of a Coordinated Program", 2 May 1949: USNA, RG 59, Decimal File 1945-49, 800.014 Antarctic, [4084].

50 L. V. Berkner, "Some Significant Polar Observations and Experiments in Electricity and Magnetism", paper to National Academy of Sciences Conference on Antarctica, 27 September 1948: NAS-NRC Central Files. The last point, and other remarks he made in the discussion, were directed at what he and others saw as the scientific inadequacies of *Operation High Jump*.

51 His role at San Francisco was probably a watching brief, guided by concern about northern hemisphere powers using trusteeships to legitimize their presence in the southern hemisphere.

invite a US diplomat to Santiago, in the hope that Washington would welcome face-to-face talks and even, perhaps, a secret bilateral treaty. With evident relief the Commission decided to leave things to the only man in the room with any idea of what to do.[52]

In July 1948, just as the US Academy of Sciences was becoming involved, Caspar Green, a State Department official, arrived in Santiago for talks with Escudero, representing the Chilean government. The professor responded coolly to the trusteeship idea, and remarked that the United States appeared to be proposing a complicated political agreement for the relatively simple purpose of facilitating scientific research. At their final meeting on 17 July he handed Green the draft of an eight-power agreement, approved by the Minister of Foreign Affairs, which amounted to a 180-degree reversal of the US approach. Instead of seeking international agreement as a prerequisite for scientific cooperation, Escudero suggested that the parties shelve the unresolved issue of territorial claims for at least five years, and in the meantime agree to mount a joint programme of scientific investigations, supported by mutual exchange of all resultant information and publications. New bases and expeditions would be encouraged, but would be deemed to have no bearing on any existing or future claims to sovereignty. When the United States officially circulated its condominium proposal in August, Chile responded in October by repeating this alternative.[53]

The Escudero Proposal was welcomed by the State Department as having "real merit",[54] and it remained central to both Chilean and US Antarctic policy for the next six years. The condominium idea was getting nowhere, but claimant governments were always happy to express support for scientific cooperation, and if a conclusive solution to the Antarctic problem was unattainable, its collective postponement might be worth having.

However, the State Department was reluctant to renounce its earlier and grander goal of formal and permanent internationalization. US officials might join the Chileans in polishing successive drafts of an Escudero-type agreement; they might encourage their southern colleagues to circulate such documents informally to the other six claimant states; they might even indicate to a third party such as Britain that the revised Escudero Proposal was the only realistic way forward.[55] But because they were not prepared to identify their own government completely with the Proposal, it made little real progress.

This schizophrenic policy, in which 'treaty first' was the official position, but an international

52 Acta de la novena sesión, 7 April 1948, Comisión chilena y actas de sesiones 1906-48, (2) p. viii: M RR EE, Santiago.

53 Escudero and Green had four meetings on three days, with an interval of two days before the last one. (Officials from the Chilean Foreign Ministry and British Embassy were present, but played no part in the discussions.) It is possible, therefore, that Escudero wrote and translated his draft agreement, and ran it past his Foreign Minister, on those two days, namely 15 and 16 July 1948. According to Jorge Berguño, however, Escudero's original text was extensively revised in the Foreign Ministry (personal communication). That suggests the final version was prepared before Green arrived, and was handed over at their 30-minute closing session precisely because, as Escudero stated at the time, it was not intended for immediate discussion but rather for studied consideration by the State Department – Green-Escudero, Memoranda of Conversations, 13 - 17 July 1948, + handwritten notes on appended draft: USNA, RG59, Decimal File 1945-49, 800.014 Antarctic, [4083].

54 Hulley - Thompson & Woodward, „Antarctica - Chilean Suggestion for a Declaration", 26 August 1948: USNA, RG59, Decimal File 1945-49, 800.014 Antarctic, [4084]. See also (*Pinochet de la Barra*, 1994: 73).

55 MemCon, Hulley & Meade, 23 March 1949: see note 41 above.

'science first' initiative would be welcomed, provided that the United States did not have to become too openly involved, remained in force when a Third Polar Year was proposed in April 1950. In particular, the records show that, *pace* Bush (1982 (1): 57), the Escudero Proposal was not abandoned by the State Department on the outbreak of the Korean War in June 1950. There were other problems, but its nemesis was a more modest military clash, the Deception Island incident of 1953, in which a British shore party demolished an unoccupied Chilean hut as well as an occupied Argentine one, by which time preparations for the IGY were well in hand. Even after that setback it struggled on for a short time.[56]

With science having played such a central role both in State Department thinking about the internationalization of Antarctica, and in the counter-proposal advanced by Chile, the question arises whether those exchanges may have prompted, or helped to prompt, the proposal for a Third Polar Year, which was put forward about 18 months later in April 1950. As we have seen, Lloyd Berkner, who is usually credited with the suggestion, took a leading part in the meetings at which the Academy was urged to focus on a possible programme for international scientific work in Antarctica. (As executive secretary of the JRDB he may also have seen some of the earlier exchanges between the Departments of State and Defense which clarified US interests in Antarctica as primarily scientific.)

In October 1949 Berkner started working for the State Department on a study of its overall responsibilities in the field of science. His final report was submitted six months later (*Berkner*, 1950). Neither the published report nor its secret annex on intelligence gathering, a major focus of the study, seems to have contained any discussion of international scientific programmes, as opposed to meetings and organizations. (But the latter has not yet been entirely declassified.) And there is no evidence that Berkner was told about the Escudero Proposal or asked for any further comments about international science in Antarctica beyond those he had recently made.

On the other hand, Berkner had worked in Antarctica and he was for the time being the Department's visiting expert on all aspects of international science.[57] Until he left Washington in 1951 he was a famously well-informed insider, with connections throughout the science, foreign policy and intelligence communities. It would have been natural for him to learn, officially or unofficially, that the diplomats were talking about a five-year international scientific effort in Antarctica. And he was better placed than any State Department official, or than Escudero for that matter, to realize that such a project would entail a Polar Year on a larger scale than its two predecessors.[58]

On 5 April 1950 eight people attended the dinner party given by Abigail and James Van Allen at

56 A State Department summary from May 1950 spelt out once again that „a sound program of Antarctic investigation could best be implemented through joint international effort": Draft Information Memo on US Policy, 17 May 1950: USNA, RG59, Decimal File 1950-54, 702.022, [3066]; see also (*Moore*, 2001: 16-17). At the end of 1953 officials in Washington and Santiago were still discussing how to launch what was known as Chile's „status quo proposal": MemCon w Chilean Minister-Counsellor, 26 October 1953: USNA *ibid*. [3067]; Minutes, Chilean Antarctic Commission, 26 November 1953, + attached memo 24 November 1953: M RR EE, Dirección Política - Departamento de Límites, 1949-56, 1958.

57 The Academy and State Department are separated only by a quiet back street, and until the 1980s were connected by a pedestrian subway. From 1948 to 1950 Berkner passed between them many times.

58 For more on Berkner's status and position in Washington, see (*Needell*: 2000, 97-153).

which the IGY was proposed, initially as a Third Polar Year. The problem for the historian is not just that neither Berkner nor any of the others subsequently mentioned any circumstances that may have prompted the idea, apart from its purely scientific attractions. It is that there are other candidates, besides Antarctic diplomacy, for the role of external stimulus. They include the first post-war proposal for a Polar Year, which was put forward by South African geologists in 1946 but swiftly squashed by the British Polar Committee in London; the repeated expressions of liberal US press and public opinion about Antarctica during 1947 (above), rarely though these mentioned science; the winding up of the Second Polar Year in 1949, in which the Department of Terrestrial Magnetism was closely involved; Cold War concerns about the lack of geophysical data from the Soviet bloc, some of which was seen as urgent for the development of long-range missiles; and a growing interest in comparing upper atmosphere data from sounding rockets launched simultaneously at dispersed locations. Berkner and most others present would have been aware of all but, possibly, the first of these.

Conclusions: From IGY to Treaty

A handful of private citizens had made themselves party to Antarctic policy discussions and kept internationalization on the list of options for four decades, until it was adopted by the State Department in 1948. The evidence is admittedly inconclusive, but it suggests that their critiques of the Antarctic ventures of Richard Byrd were every bit as effective with the wider US public as the fervent nationalism which hailed the Admiral in so much of the media. It was in that context that, soon after the Second World War, diplomats began promoting something they did not even know was called a Polar Year until it was taken up by scientists in 1950. The political contribution of the IGY, however, is harder to pin down.

Behind the scenes, much of the planning and execution of the IGY in Antarctica was a matter of politically competitive business as usual. (This cannot be illustrated properly for lack of space.) Rival diplomats took a large part in the top-level preparations. Even declarations that the IGY was non-political were resented as political by some of those who paid them lip-service. The claimants went to 'their' sectors and issued the usual proprietorial welcomes to 'visiting' expeditions. The non-claimants acted out postures of non-claimancy. The United States prompted and assisted its allies to occupy as many locations as possible, and took on extra ones itself, in an unsuccessful bid first to prevent and then to minimize Soviet participation. The Trans-Antarctic Expedition tried to stage a last hurrah for British imperialism. The mother-daughter radio communications network was badly distorted by national interests. National flags and military emblems were flourished on all sides. Considerable effort was expended on military and resource programmes that were nothing to do with the IGY, some of them ongoing within established national Antarctic organizations. Several stations were not really considered to be IGY stations, even if some of their observations, usually meteorological, were sent in.

Arrangements for Antarctica after the IGY were also circumscribed by politics. It was unthinkable for the Weather Central to be transferred to Mirny Station, or for Halley Station to be abandoned to possible Argentine occupation. Australia held out against extending the 'non-political' IGY because it would sanction Soviet stations in its claimed territory. The United States bequeathed some of its extra stations to allies on a sectoral basis; the recipients affected to see this as endorsement. Some

scientists privately disparaged the work of colleagues from other countries. The terms of reference of the new Special Committee for Antarctic Research, and similar bodies, represented a centralization of power, towards the International Council of Scientific Unions and away from the unions themselves, which was not universally welcomed.

The treaty negotiations, carried out by diplomats, were protracted and difficult, and came close to failure. They were the final stage of a diplomatic process which began before the IGY was thought of and which encompassed the utility of scientific cooperation well before that particularly outstanding example came to hand. That said, however, they were probably rescued by the IGY.

The actual science that scientists were doing for the IGY in Antarctica was not politically important, as long as their exploring achievements were respectable and they kept the photographs flowing back to their national media. What mattered, and mattered greatly, was the *appearance* of internationalism which was fostered by the programme's highly effective publicity. Added to that was the commitment of political leaders to maintain that ostensible transformation of the situation. It was no accident that the government which had committed itself least to the IGY, that of Argentina, would pose the greatest problems for negotiators.

To put this another way, the political contribution of the scientists was that, guided to some extent by diplomats, they out-Escuderoed Escudero. The State Department had proposed full-blooded legal internationalization to secure (and direct) Antarctic science as a common (or at least a Western) good. Escudero, in a defensive move aimed at protecting Chilean sovereignty, had countered by proposing a temporary inter-governmental agreement just to do the science. But with the IGY, governments were not even parties to the non-existent agreement, so to speak.[59] Escudero had suggested starting small; the IGY went ahead and started even smaller. (The fact that its detailed planning began just after the Escudero process ran into serious problems cannot possibly have been foreseen, but was a real bonus.) As the Treaty later showed, getting agreement to something very like the Escudero Proposal was no light matter. One has to wonder whether Escudero realized that when he suggested it. And if the IGY effectively finessed the diplomatic log-jam, Escudero included, one has also to wonder who, at the time, may have realized that it could serve that purpose.

Postscript

It took 46 years from the signing of the Treaty for the first Antarctic station ever to be installed by a claimant country outside 'its' sector. And France acquired a non-claimant partner, Italy, before doing so. It remains the only such station.

Symbols and Abbreviations

[##]	box
\??/	folder
M RR EE	Ministerio de Relaciones Exteriores

59 Not that they were on an equal footing. The United States government received more advance information and consultation about politically sensitive developments in the IGY than any other, because most of the time they were initiated by American scientists, and above all by Berkner. But that is another story.

NAS-NRC Archives of the National Academies of Science and National Research Council
RG Record Group
USNA US National Archives

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THE SEARCH FOR AN ORGANIZATIONAL FRAMEWORK FOR ANTARCTIC RESEARCH (1948-1985)

Jorge Berguño

Abstract

This paper takes up certain elements of the protracted negotiations that led towards the signing of the Antarctic Treaty. It brings into focus a number of aspects that have been generally neglected or, at least, not sufficiently emphasized in the literature on the subject. The issue addressed is: what type of scientific organization was envisaged by different actors to serve as the cornerstone of a viable international regime for Antarctica? A review is made of four successive models proposed at different stages of the negotiations with an eye to managing the emerging Antarctic Science.

The first attempt to construct a model for a scientific management component within the framework of a multipartite political regime for Antarctica emerged in 1948 in the proposals for a trusteeship or a condominium made by the United States. The U.S. draft for a condominium in its Article III made provisions for what was called an Antarctic Commission. This body was meant to constitute the government of the territories and, affiliated with it there was to be a Scientific Board. The function of the latter would be to draw up a General Plan for exploration, investigation, plus scientific and technical development.

In a second model the U.S. suggestion of an Antarctic Commission was replaced by the notion of a Consultative Committee contained in a Chilean counter-proposal in 1949 for a temporary *Modus Vivendi*, whose principles specifically touched on a framework, conditions and role for science. Two countries associated to this proposal, the U.S. and the UK, desired a strong "Consultative Committee" whereas Chile preferred an informal consultative body. When Chile bowed to the views of its partners, Australia considered the powers of the Consultative Committee as the "thin end of the wedge in whittling away national sovereignty and setting up the international regime favored by the United States and the Soviet Union", a cautionary view also shared by Argentina.

The third model that emerged was embedded in a proposal coming from the UK. Owing to its radical character the proposal evoked opposition from all the claimant countries, including the internationalist New Zealand. The reason was that the new scheme advocated the creation of a "High Authority", centralized scientific planning system and no links with the United Nations.

The fourth – and final – model is the one that thanks to a combination of fortuitous circumstances is in place today, namely SCAR. The course of the International Geophysical Year, the cooperative discipline it imposed in dealing with global scientific issues, and the birth of the Special (later Scientific) Committee for Antarctic Research (SCAR) brought about a new situation. Taken altogether these developments contributed to the decision (1959) at the Washington Conference to empower that body to fulfill the function of a scientific arm of the Antarctic Treaty. A Chilean proposal for an International Institute of Antarctic Investigations

which echoed the 1948 initiative of Thomas Huxley was overrun by a constructive arrangement that still stands today.

The Background of the 1948 American Antarctic Initiative

Several authors have provided valuable insights regarding the origin and development of American policies towards Antarctica. The most comprehensive of these is the essay by Jason Kendall Moore, "*Tethered to an Iceberg: United States Policy toward the Antarctic, 1939-1949*". His contribution to the understanding of U.S. motivations is a fundamental one, and it may be contrasted to the approach involved in the development of a more geopolitical perspective by C.C. Joyner and E.R. Theis in their book, "*Eagle over the Ice. The U.S. in the Antarctic*". J. K. Moore's essay identifies the difficulties, hazards and risks involved in a global approach that led to apparent contradictions, not only within the U.S. Latin American sphere of influence, but also on the broader international scene. Joyner and Theis on the other hand conclude that, in spite of these difficulties, the U.S. had the final word in the construction of the Antarctic Treaty System. Jason K. Moore for his part asserts that the Chilean "Escudero Plan" laid the foundation for the Antarctic Treaty.[1] In my view, both of the forgoing interpretations have their respective merits. Nevertheless it is possible to provide a more complex and nuanced approach if one probes carefully into the nature of the particular types of international regimes considered by the various actors at different historical conjunctures. In doing so, one also has to consider the structures for the coordination and management of science provided for in those proposals tabled by different parties during the negotiations opened by the 1948 American initiative for an Antarctic International Regime.

Basically, when compared to the approach taken by Moore and Joyner, as well as the one assumed by the Chilean historian Consuelo León, the present essay differs methodologically by focussing attention primarily on the outcome at each stage of the protracted negotiations that occurred over a longer period of time, starting in 1947 and ending 1959. Moore, Joyner and also León emphasize the process and performance of policy actions. Consequently they focus predominantly on the fabric of policy-making reflected at various stages in the decision-making process. In that particular context, their contributions remain essential. However there is yet another dimension that needs to be considered, one that generally comes to the fore in the genre of diplomatic history. In that domain the writer is wont to reflect upon the finished product, be it a treaty, a *modus vivendi*, a peace truce or an armistice, an alliance or any binding instrument agreed upon or unilaterally imposed. In those cases the analyst makes his/her assessment of the finished product in the context of the prevailing historic circumstances. This approach has been taken, in particular, in my previous paper on "The Intellectual Sources of the Antarctic Treaty" introduced at the II SCAR Workshop on the History of Antarctic Research. It is important to acknowledge that it is generally recognized that the methodology of traditional diplomatic history nowadays gains indispensable support from scholarship in neighbouring fields, i.e., political science, international law and the theory of international relations and, in that respect, the present paper complements rather than contradicts the existent literature.

[1] Moore: 126

The First Initiative Concerning an Antarctic Scientific Framework

A Chilean demarche at the State Department, made on 13 October 1947, requesting the U.S. views on certain Antarctic matters and suggesting a possible International Conference on Antarctica was answered negatively by the U.S. on 3 November 1947, confirming a previous statement made by the U.S. Secretary of State on January 7 of the same year, to the effect that "the relative importance of Antarctic questions in view of the many more important current topics which exist, was not such as to justify a conference".[2] However, a few days later, on 27 January, a confidential U.S. policy paper put forward the preferred option for an eventual settlement of territorial problems by international agreement. The substance of the option oscillated between the notion of a UN Trusteeship and that of an eight-power condominium wherein all claims would merge and consolidate under a single authority. It is important to recognize that both alternatives highlighted the pursuit of global scientific objectives.

By early March 1948, the U.S. was busy considering the implications of a resolution concerning European possessions in the Western Hemisphere. Such a resolution was to be introduced at the Bogotá Inter-American Conference, and it would have bearing on the U.S. position concerning the Argentine-Chilean Antarctic dispute with Britain. While both Argentina and Chile viewed the upcoming Bogotá Conference as an opportunity to rally Latin American support for their respective Antarctic claims, and to further maintain their distance from the Anglo-Saxon Powers (United States and Britain) or at least carve out their mutual differences, they did not want to place their national claims to Antarctica under the umbrella of "decolonization" of European Territories in the Western Hemisphere. Nonetheless, expectations of a further clash or the weakening of an Inter-American interest clearly signalled to the U.S. the importance of an independent path towards a solution of the Antarctic problem. In this context, U.S. State Department planners recommended first, as a way to overcome the dispute, support for an international status for Antarctica in form of a UN trusteeship.

Wishing to anticipate and influence discussion of Antarctic matters at Bogotá, in July 1948 the U.S. initiative was conveyed to Argentina and Chile through a special envoy, Caspar Green, and distributed simultaneously on 9 August, in Washington, to all other claimants in the form of draft treaties containing the two options: UN trusteeship, or alternatively a condominium with no UN linkages. The first option was quickly dropped because it was contentious and had already been rejected by the United Kingdom and other claimants. The second option entailed a treaty that would establish an Antarctic Commission, a body that was meant to constitute the actual government of the territories with full executive and administrative powers.[3]

The first model for an Antarctic scientific administration thus emerged as a by-product of the powers entrusted to the postulated Antarctic Commission. A subordinate body, probably a Scientific Board, was also envisaged, having the task of establishing a "General Plan" wherein individual national projects would be integrated. Final decisions on both political and scientific matters were to be taken by the Antarctic Commission by a two- thirds vote.

[2] Foreign Relations of the United States (FRUS) 1947, I: 1050-1052
[3] FRUS 1948, I: 996-1001

Most of the responses to the U.S. proposal of 1948 fixed attention on the status of claims and included the rejection by all claimants, except the UK and to a certain extent New Zealand, of the fusion of such claims. The objective contained in Article II of the draft Agreement reads as flows: "…the Parties hereto merge and join their claims to, and interests in, specific portions of the area covered by this agreement (the Antarctic Continent and all islands south of 60º south latitude, except the South Shetlands and South Orkney Groups) and vest such individual claims and interests in the special regime hereby established…". This text remained unacceptable to most claimants and, at least Norway and Chile rejected the exception concerning the two Antarctic archipelagos, as a matter of principle for both countries and, in the Chilean perspective, because such a formulation seemed to support the British approach towards a judicial settlement of the existing dispute.

Two replies, one by France, the other by Norway, concerned also the operation of the institutional framework, and one of them touched specifically on the issue of scientific cooperation.

The French Embassy in Washington sent an *Aide-Mémoire* to the U.S. State Department. This statement has hitherto not been published. It contains an initial positive reply to the concept of the condominium but indicated that the French Government felt that the internationalization of Antarctica could be realized without the abandonment of national claims of sovereignty in the area. The French diplomatic note moreover requested further clarification of the Antarctic Commission that was being envisaged as the decision-making system and asked about the intended scope of the regime. In response to the French request the State Department further elaborated and shed additional light on this sensitive aspect of the operation of the proposed regime. The following paragraph in the U.S. clarification is interesting for its idea of combining freedom of research with some kind of international coordination.

"The United States proposal is intended to provide for complete liberty of bona fide scientific research. In order to promote the rational planning and carrying out of such research, the proposal recommends the development by interested countries, acting through the Antarctic Commission, of an overall Plan of Scientific Investigation. It is hoped that each of the participating countries might undertake, upon completion of the General Plan, so to plan its individual projects as to contribute to the accomplishment of some portions of that General Plan. It is felt this would be a useful arrangement to avoid duplication of effort, and promote full, well rounded investigation. However, with the single exception that no two expeditions should be stationed in such immediate proximity as to interfere with each others operation, the United States Government feels that each country should be entirely free to send independent expeditions into any part of the area. It is the thought of the United States Government that the regime would, as a minimum, promote and facilitate the exchange and common availability of scientific results".[4]

The foregoing statement satisfied neither France nor other claimant states, even though it was accompanied with the indication that the U.S. would welcome suggestions for further clarifications. None of the Parties, however, felt reassured regarding the overall powers of the Antarctic Commission and the nature of the international regime being proposed. It is useful to

[4] FRUS 1948, I: 1005-1008

recognize, nevertheless, that the concept of a "General Plan" and its intended purpose of avoidance of duplication of scientific effort and the promotion of "full, well rounded investigations", anticipated in some ways the decisions taken much later at the 1955-57 Antarctic Conferences for the preparation of the International Geophysical Year (IGY).
The Norwegian reply to the U.S., made on November 15, 1948 by Ambassador Morgenstierne, argued against political internationalisation and pleaded the case for an improvement instead of the replacement of existing scientific cooperation. Norway pointed to the existing international cooperation in areas such as whaling and the provision of meteorological information for navigational and scientific purposes in Antarctica. It was suggested that these exchanges and other types of scientific cooperation could expand into other scientific domains without any need to alter the existing legal and political status. A precedent for meteorological co-operation in the Southern Ocean had already existed for some years in the service provided for whaling ships by weather information centres at Cape Town and Sydney. The Norwegian suggestion, following an initiative by the South African Weather Bureau at Pretoria and on a recommendation in 1952 by the Commission for Maritime Meteorology of WMO, historically, also became a useful precedent for the IGY weather analyses in the Southern Ocean. However, the nature of Norwegian concerns in 1949 appear to have to arisen mostly in connection with the proposed Norwegian-British-Swedish Antarctic Expedition (1949-52), whose independence Norway wished to preserve.[5]

The Alternative Proposal

The U.S. proposals put forward in 1949 were also rejected by Chile. That country responded by introducing its own counter-proposal in the form of an "Antarctic Declaration". The text advocated five points, supporting the following measures:

- Commitment to full exchange of scientific information;
- Sovereign rights of claimant states not to be prejudiced by new bases, installations or expeditions;
- Common use of all scientific facilities established or developed in Antarctica;
- No taxes on fishing fleets of participant governments; and
- A stand-still on the status of claims during a renewable 5 year period.

The first commitment built upon and amplified ingredients in the U.S. proposals. Nonetheless, the original draft of the Declaration - crafted by Professor Julio Escudero –underwent modification in the hands of other officials in the Chilean Foreign Ministry. References to common property or common use of scientific facilities in Antarctica (point three) were suppressed and hence not conveyed to Caspar Green. While the idea of an overall planning agency advocated by the Americans seemed to be rejected by other Parties, the common use of facilities and the notion of their international governance was considered an idealistic fantasy by Escudero's own compatriots, who did not share his concerns either regarding possible damage to the whale stocks by acoustic experiments undertaken or planned by the Byrd expedition. Nevertheless, in the draft presented to Green, the full and complete exchange of the scientific product of Antarctic expeditions was emphasized and an "all data" clause anticipating article III of the Antarctic Treaty was included.

[5] FRUS 1948, I: 1011-1013

Some of the elements contained in the "Escudero Proposal" were included in the text of a "*Modus Vivendi*" (revised several times) discussed between Chile, the U.S. and the UK between 1948 and 1953. The latter year was when the critical British actions in Deception Island dramatically changed the international scene. Nevertheless, the non-prejudicial clause (point two) became the forerunner of article IV in the Antarctic Treaty. During the negotiation of the *Modus Vivendi*, the British and Chilean negotiators only occasionally met in Washington, and the U.S. State Department synthesized both the Chilean drafts and the British amendments. Consultations to third Parties took place only after the three Parties (Chile, the U.S. and the UK) had agreed that sufficient progress had been made in these tripartite negotiations.

Inclusion in the agreement of issues concerning licences and taxes imposed on whaling fleets (point four) was not admissible to the UK and the U.S., and would also be opposed later (when Antarctic Treaty negotiations started) by the USSR with reference to the already existing mandate of the International Whaling Commission (IWC). On the other hand, the various drafts of article IV of the Antarctic Treaty did not allow any side to press any existing juridical position and hence the requirement for whaling licences in Antarctic waters would in time disappear naturally. It is interesting to note also that whereas Chile was not considering a permanent but only a temporary stand-still situation, the UK believed that Chile was in fact trying to weaken the importance of administrative acts performed in the Antarctic regions by the British authorities. Such an endeavour, however, was hardly feasible within the time frame of a *modus vivendi*, and even less so when a strong majority at the Washington Conference imposed the notion that the Antarctic Treaty would stand as a permanent settlement. In Washington, consequently, Chile wisely decided to accept a metamorphosis of its idea as "preservation and conservation of living resources in Antarctic", an idea encapsulated in article IX of the Antarctic Treaty.

In the negotiations with Chile for a package agreement that started in 1949 the U.S. and the UK also coordinated their respective positions towards the Chilean proposal. They sought to include the notion of a "Consultative Committee" in the tripartite package before it was circulated to the other Parties. The institution of a "Consultative Committee" was meant to address all matters of common interest and, in particular, those concerning scientific cooperation. It therefore appeared to be a more democratic version of the earlier U.S. proposal for an Antarctic Commission, but agreement on its nature, scope and powers remained difficult to implement. For some time Chile tried to diminish and weaken the importance of the Consultative Committee. When Chile agreed to what seemed, in July 1951, to be the final version of the proposed "Antarctic Declaration" with the British and American requirements for a Consultative Committee, and the document was circulated to the other claimants, there was new opposition. Argentina and Australia opposed the proposal, in particular its Article 8 that stated "The Committee shall have authority, on behalf of the signatory countries, to grant permission to countries other than the signatory countries to conduct exploration and scientific investigation and research in the Antarctic area. However, the signatories will not recognize such expeditions carried out during the life of the agreement as a basis for territorial claims". Australia insisted that the Consultative Committee and its procedures might ease the issue of Russian membership and "would be the thin end of the wedge in whittling away national sovereignty and setting up the international regime favoured by the United States and the Soviet Union".[6] Towards the end of 1951, the U.S. State Department

[6] Templeton: 158

produced another revision of the *Modus Vivendi* and exchanges continued with Britain and Chile, now with a new emphasis on an imminent American claim.[7] The British destruction of Argentine and Chilean huts on Deception Island in February 1953 effectively ended the discussion of an overall stand-still agreement, and shifted the efforts of diplomacy instead in the direction of trying to obtain a tripartite stand-still of hostilities (Argentina, Britain and Chile) through the renewal of a 1949 tripartite agreement on the limitation of naval expeditions. This was the situation when later the British unexpectedly introduced a surprising diplomatic turn of events on 12 January 1959 by asking for political and scientific cooperation among the three claimants to the Antarctic Peninsula Region, an option that was still being discussed on the eve of the Antarctic Treaty.

A Multinational Antarctic Authority

In January and February 1958, during the IGY, the British Prime Minister reviewed with the Australian and New Zealand Governments proposals that the nations active in the Antarctic should discuss means of ensuring that Antarctica remained effectively de-militarized and entirely open for scientific investigation. The thrust of the MacMillan proposal appeared excessively internationalist to the Chilean and Argentine governments which firmly maintained their positions on questions of territorial sovereignty within the region. By 20 January 1958, the Australian Cabinet had opposed internationalization, while the New Zealand Minister Mr. Nash publicly advocated an international regime for Antarctica, under the auspices of the United Nations. The U.S. Department of State invited the Commonwealth countries to multilateral conversations to be held in Washington, where the pendulum swung back again to matters of Antarctic scientific organisation with an articulate British proposal.

However, the British draft[8] for a nine-power High Authority, comprising claimants plus U.S. and USSR, with only minimal links with the UN, was rejected by Australia, and remained unsatisfactory to New Zealand and the U.S. Its federalist overtones reminded the British inclination for federal solutions in decolonization processes, perhaps excessively for the Australian nationalists, but insufficiently for New Zealand internationalists.

The draft convention provided that the Parties would retain their titles or claims to Antarctica but would renounce all governmental, administrative and jurisdictional powers in favour of a "High Authority" entrusted with all governmental powers, including law-making capacities. It would promulgate uniform civil and penal codes, establish courts and even an Antarctic Police Force. The Authority would operate a system of inspection. A "Council", whose powers would be recommendatory except for approval of the budget, would implement a centralised planning of Antarctic research by a majority vote of its members.

One can reflect on the logic of this almost full internationalisation from the perspective of the UK. Britain had, through the years, somehow changed its position concerning its own Antarctic claim, but was also the nation with a larger and more profound investment in Antarctic science. While there was no acknowledged "merger" of the claims, these retained only a symbolic value, while participation in the scientific arena was significantly enhanced in the proposal.

[7] FRUS 1951: 1734-1736
[8] Templeton: 185

The Role of IGY Structures and Decisions

Negotiations on a legal-political Antarctic regime lasted more than a decade, extending from 1947 until 1958, when the Preparatory Meeting for the Antarctic Conference was convened. The principles, decisions, arrangements and structures for the International Geophysical Year were stipulated at the various IGY Antarctic Conferences (1955-1957) a short but greatly productive period. A strong interdependence exists between the two processes, the scientific on the one hand and the political on the other hand, but any attempt to assert a cause/effect relationship is not enlightening.

The relationship, rather, was dialectical. There was a very strong political and diplomatic Antarctic contribution to the organization and results of the IGY Antarctic Conferences. In turn there was a decisive input from the IGY to the Treaty System: organisational, planning, distribution of tasks and responsibilities, and codification of rules on the conduct of scientific investigations. Thus it was a matter of a co-evolution of political and scientific orders. Scientific needs made co-operation mandatory in both logistic resources and scientific results had to be shared. This was only possible because of the "Gentleman's Agreement" initiated by Argentina and Chile which placed political problems temporarily in abeyance. The message to the political negotiators was that such fruitful cooperation could proceed only on the basis of the IGY political stand-still becoming a permanent feature of any future Antarctic settlement.[9]

In summary, the legacy of the IGY, introduced into the Antarctic Treaty, includes the following guiding principles:

(a) Scientific activities and their associate logistics may not prejudice the legal and political positions of the participating nations (Resolution 1. Argentine-Chilean Interpretative Statement introduced at the Paris Antarctic Conference (1955).

(b) The words, "Freedom of scientific investigation in Antarctica and cooperation towards that end, as applied during the IGY" (Article II, Antarctic Treaty), which encapsulates the living and continuing legacy.

(c) The IGY ended in 1958. ("Geophysical Cooperation" in 1959 was not officially part of the IGY) but it was agreed that "scientific investigations should continue thereafter".

Conclusion

The Antarctic Treaty refers to the IGY in its Preamble and in its Article II. According to Article II, the kind of scientific investigations made during the IGY, and cooperation to that end, "shall continue subject to the Treaty". The sentence "as applied during the IGY" cloisters scientific research within restraints indispensable to its success (sitting of stations, international division of scientific labour, overall importance of global problems, economy in their solution, and free exchange of information). The Treaty also defines the scope, channels, procedures and structures for the conduct of science.

[9] Whiteman V. 2: 1242-1243

Issues concerning the structure arose during the 1958 Antarctic Treaty Preparatory Meeting. Chile submitted a project for an International Institute for Antarctic Investigations funded and managed by the Parties.[10] The inspiration for such a proposal came from Thomas Huxley, Executive Director of UNESCO who, in 1948, had suggested that UNESCO could host the Institute and build a bridge with the United Nations on the one side and the International Council for Scientific Unions (ICSU) on the other. At the time Huxley's suggestion was not kindly received. Ten years later, the Chilean Delegation (with its revival of Huxley's idea) was praised but not followed. The Chilean initiative, coming from a country whose lack of material resources had and adverse impact on its IGY research, was not aimed at the construction of a genuine international research institution, but primarily concerned with a United Kingdom initiative for a Protocol which would allow third Parties to pursue activities in Antarctica, without becoming Parties to the Treaty but adhering to its principles. Chile thought that the International Institute it advocated could become a more strict and demanding filter for the consideration of scientific proposals by non-member countries. At some time, members of New Zealand Prime Minister Nash's staff had considered that SCAR could play that intermediary role as well, and the U.S. took the lead in proposing SCAR as the scientific arm of the Treaty. In a parallel process, a broad consensus emerged on the basis that scientific research should remain the preserve of the Antarctic Treaty countries and that countries that were Parties to the UN and manifested their interest in Antarctic research could accede to the Treaty or be invited to accede.

However, the final product of what became a major issue, the relevant article XIII, is less open since the invitation to accede for a Party not member of the United Nations must be agreed by "all the Contracting Parties whose representatives are entitled to participate in the meetings provided for under Article IX of the Treaty". While the U.S. and Chilean proposals concerning the scientific framework designed for the Treaty System differed, they converged with the views of other Parties on one key aspect: the common aim to allow scientists from countries outside the ring of Antarctic Treaty signatories to participate in Antarctic scientific activity, but not to encourage third States to accede to political decisions unless and during such time as that new Contracting Party "demonstrates its interest in Antarctica by conducting substantial scientific research there, such as the establishment of a scientific station or the despatch of a scientific expedition", as determined by Article IX.2.

What seemed to be a liberal accession clause in Article XIII, was only a half-hearted acceptance of universality, since the opening for accession by "any State which is a member of the United Nations, or by any other State which may be invited to accede to the Treaty with the consent of all the Contracting Parties whose representatives participate in the meetings provided for under Article IX of the Treaty" would in fact limit participation in the implementation of practical arrangements to the original signatories together with those acceding States which maintained a demonstrable interest in Antarctica by conducting scientific research.

The Antarctic Treaty has as its declared objective the preservation of the freedom of scientific research, a freedom qualified by the reference to the significant discipline applied to scientific effort by the IGY. It is also a political accommodation through the protection awarded by Article IV of the Treaty to all legal positions, claimants, non claimants and basis of claim supporters. Moreover, the road towards this special international regime included the search for a mutually

[10] Beck: 658

acceptable framework for scientific cooperation. This step was indispensable since the whole process of political accommodation within the evolving Antarctic Treaty System is governed by a special regime for science. The 12 original members are the States active in Antarctica during the IGY; the subsequent members are those Contracting Parties recognized as complying with the standards of "substantial scientific research". The rule of consensus is thereby linked to a requirement of scientific activity to generate the decision-making procedures of the emerging system.

Due to the distrust of third parties and fences designed to limit their participation, as well as the difficulty to relate the Antarctic Treaty System to the outside world, SCAR remained for many years the unofficial adviser and informal helper, kept at arms length by the ATS. Some Parties thought this informality and at times anonymity helped maintain the impartiality and independence of SCAR.

Finally, at the Thirteenth Consultative Meeting (ATCM XIII, Brussels, 1985) the Parties required in Recommendation XIII-2, "regular reports" about the activities of its components, including SCAR, whose Chairman, Dr. Claude Lorius, expressed satisfaction with the acceptance by the Treaty of the hitherto "illegitimate child".[11] The updated ATCM Rules of Procedure, (ATCM XXVIII, Stockholm, 2005) make SCAR and other bodies (CCAMLR & COMNAP) permanent observers for the purpose of their reporting duties.

Chile had, with its proposal for an International Antarctic Institute, inadvertently resurrected the issues that the "Consultative Committee" had raised at the time the *Modus Vivendi* was discussed. During the Washington Conference, a very important decision definitively settled this matter. There would be no Consultative Committee, SCAR would not perform that role, and consultation in accordance with Article IX would be forever a process, the vital and endless process of recommending measures to advance the principles and objectives of the Antarctic Treaty. With time, the Protocol would bring into a more complex Treaty System, not a "Consultative" but an "Advisory" Committee for the Environment (CEP).

Some inconsistency in the matter of scope remains. The Treaty defines its area of application as south of 60ºS. SCAR has chosen the Antarctic Convergence which was favoured from the start by the USSR, and extends its studies into the Sub-Antarctic. The Protocol to the Antarctic Treaty for the Protection of the Environment (1991) obviously applies to the same area, but all its references to the Antarctic Environment are made in connection with the "dependent and associate ecosystems". Scientific tradition, habits and practices make it extremely difficult to compress the scope of Antarctic science into artificial boundaries. Beyond the purely scientific interest, the boundary of the Antarctic domain versus the International Authority for the Seabed is undetermined and entangled in a discussion involving two lines applicable to the prohibition of Antarctic mining: 60º South or the Antarctic Continental Platform. Current work in progress on bio-regionalisation of the Southern Ocean, a common project for the Committee for Environmental Protection (CEP) of the Antarctic Treaty and the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) expands the area of scientific

[11] This remark is not included in the respective SCAR Report or the ATCM XIII Official Report.

interest even beyond the Antarctic Convergence. In that broader context, the Census of Marine Life must be recognized as one of the outstanding contributions of the International Polar Year.

Relations with the UN and its Agencies improved but remained ambiguous. In 1956, India requested that the Question of Antarctica be put on the Agenda of the UN General Assembly. India was persuaded to abandon its request, as was also the case with another attempt in 1958. Some decades later, during the negotiations pertaining to the Convention for the Regulation of Antarctic Mineral Resource Activities (CRAMRA) "The Question of Antarctica" was once again on the Agenda of the UN General Assembly and it took some years for its unsuccessful discussion to end. In both instances, India played a constructive role, and is now an important partner, as a Consultative Antarctic Treaty Party. The resilience of the Antarctic Treaty System has been demonstrated, but the interface of science, politics and law, continues to develop as a promise and a challenge to the Treaty System during the XXIst Century.

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THE INTERNATIONAL POLAR YEAR (1957-1958) AS REFLECTED IN GERMAN MEDIA

Cornelia Lüdecke

Abstract

The announcement of the International Geophysical Year (IGY, 1957-1958) brought Antarctica back into the headlines of West German newspapers in connection with the potential exploitation of mineral resources and territorial claims. The discussion of a private German expedition plan as well as of the general preparation of the IGY took place at a time of political and military rivalry between Washington and Moscow. In this context military metaphors were prevalent in newspaper articles. This built up a discussion on international management, referring to mineral resources and flight routes from South America to Australia. Antarctica mentally served as a resource base and there was a great optimism about its economic exploitation. Scientific preparations for the IGY were seen as components of a race to still unclaimed regions, and to reflect the economic and military demands of the great powers, which were considered to be looking for an expansion of their influence. The Cold War dominated the language of West German newspapers and illustrated magazines. During the IGY military terms were especially used in reports about the Commonwealth Trans-Antarctic Expedition (1955-1958). Even popular books published in East and West Germany focused - besides adventure - on mineral resources and on the possible significance of Antarctica from the military (especially Cold War) perspective. However books published in East Germany, moreover, also focussed on socialist heroes to strengthen the young state.

Introduction

The 3rd German Antarctic Expedition (1938/39) had performed the most extensive photogrammetric survey of the new discovery of Neu-Schwabenland with its high mountain range before World War II. The aim was to prepare occupation to secure whaling in an area which was claimed by Norway just before the German expedition reached Antarctica. A preliminary map of Neu-Schwabenland was produced very quickly in 1939 and in a slightly corrected version in 1942[1]. But without any ground control points it was very difficult to determine correct positions only from overlapping photographs. Nevertheless the Norwegian-British-Swedish-Expedition (NBSX) to Antarctica (1949-1952) used this map of significant geographical discoveries for expanding their exploratory flights to the eastern border of their research area (Fig. 1)[2].

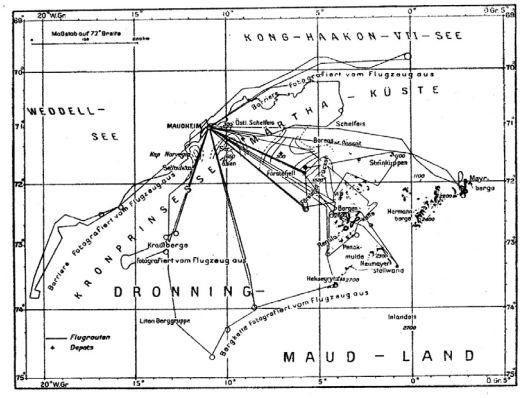

Figure 1. Flight routes of the Norwe-gian-British-Swedish-Expedition from Maudheim to Neu-Schwabenland (Dronning-Maud-Land) in 1952[3].

[1] Ritscher 1939, 1942.
[2] See maps on page 232 and 367 in Giæver (1956). On the NBSX see also Elzinga 2007 and Lewander 2007.

A corrected map of Neu-Schwabenland was available as preprint but not before 1954[4]. In the same year a map of the scale 1:4 million was published in four sheets by the same author[5]. Also, a popular German survey chart of Antarctica including some details of Neu-Schwabenland was distributed on 10 May 1954 (Fig. 2)[6].

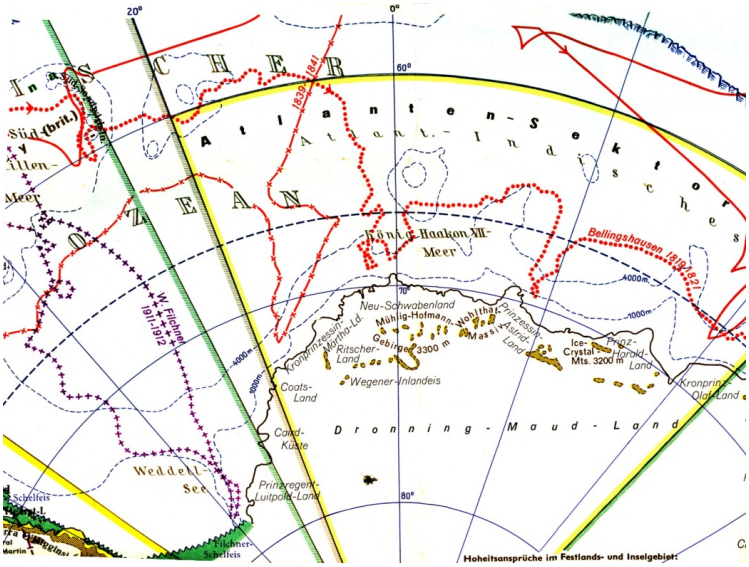

Figure 2. Detail of a new German map of Antarctica showing Neu-Schwabenland printed in 1954[7].

Thus Antarctica was already a common topic for German geographers when the International Geophysical Year (IGY, 1957-1958) was officially announced in 1954. Now the southern continent entered the headlines of West German newspapers and the use of military terms and metaphors was not unusual as will be shown in this paper. Already in January 1953 a German magazine focussed on "Quarrels about the South Pole", because "Nine nations have interests in the "last Continent" of the earth"[8]. These nations were listed as Argentina, Australia, Chile, New Zealand, South Africa, as well as Great Britain, Germany, the Soviet Union, and the USA. It is astonishing that Norway is not mentioned as claimant state. Territorial claims were seen in connection with the anticipated potential exploitation of mineral resources following Admiral Richard Byrd's most recent expeditions (1939-1941, "Operation Highjump" 1946-47), although the economic problems of mining were not yet solved.

However a great optimism about economic exploitation was prevalent. Instead of the internationalisation of Antarctica, an increased emphasis was placed on the strategic importance of Antarctica at the national level. In this context a regional newspaper published a long paper on a "Continent without people"[9]. Besides a review of the German contribution to Antarctic research, the author described the useless efforts towards an internationalisation of Antarctica. Instead, various national claims (Fig. 3), mineral resources, and strategic importance as well as future trans-Antarctic flight routes would ensure the South Pole region retained political importance, as had happened already for the North Pole region.

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[3] Giæver 1956: 367.
[4] Kosack 1958, first published as preprint in 1954a (Kosack 1954a). A final revision of the flight tracks and the subsequent revision of the map of Neu-Schwabenland was prepared in the middle of the 1980s (Brunk 1986, 1987).
[5] Kosack 1954b, Lüdecke 2009.
[6] IRO 1954.
[7] From IRO 1954.
[8] Anon. 31.1.1953.
[9] Sponsel 1954.

Figure 3. Map of Antarctica with international claims including Neu-Schwabenland and the area of the Federal Republic of Germany in the same scale for comparison[10].

This map shows that a possible German claim would include a larger region than West Germany. In the accompanying article it was not defined, what a "German claim" would exactly mean. As it was addressed in a western newspaper, it obviously implied the expansion of the Federal Republic of Germany (FRG). The East German point of view at that time still has to be analysed.

In principle there was a difference on both sides of the "iron curtain" dividing Germany into east and west. After a long debate about re-armament The FRG became a member of NATO in May 1955. Subsequently the "Bundeswehr" (Federal Armed Forces) was established in 1956, while France, Great Britain and the USA maintained their military bases and airports in West Germany. Also in 1956 the "Nationale Volksarmee" (National People's Army) of East Germany was established and exploited by the Soviet Union for its hegemonic purposes.

Germany and the International Geophysical Year

Some west German scientists, especially the Göttingen geophysicist Julius Bartels (1899-1964), who had been elected as president of the International Association for Geomagnetism and Aeronomy (IAGA) in 1954 (until 1957), had been very influential in the preparation of the IGY. Bartels' survey paper in the *Naturwisssenschaftliche Rundschau*, a journal providing a survey of current research in natural sciences, gave an overview on the first two International Polar Years and then explained the goals of the IGY[11]. Despite the wish of scientists from the FRG to participate in the IGY, it was more or less clear that West Germany could not send any expedition to Antarctica, which for the first time would be the main focus of a polar year. The non-participation was regretted by scientists and members of former polar expeditions like Johannes Georgi (1888-1972), who had been leader of station "Eismitte" during Alfred Wegener's (1880-1930) last expedition to Greenland (1932-1933)[12].

[10] Sponsel 1954.
[11] Bartels 1955.
[12] Georgi 1955, 1956.

Against this background, the physician and famous mountaineer Karl Maria Herrligkoffer (1916-1991) proposed a private German South-Polar Expedition with 30 participants costing 2 - 3 Million DM (Fig. 4)[13].

Herrligkoffers Südpolpläne

Expedition kostet 2 bis 3 Millionen DM — 30 Wissenschaftler sollen mit

dff **München**, 8. August. (Von unserem Korrespondenten.) Der Münchener Arzt Dr. Herrligkoffer hält an seinem Plan fest, zum Geophysikalischen Jahr 1957/58 eine wissenschaftliche deutsche Südpol-Expedition auf die Beine zu stellen. Hinter dem Vorhaben steht das „Deutsche Institut für Auslandsforschung" in München. Dr. Herrligkoffer, der vor zwei Jahren die Nanga-Parbat-Expedition geleitet und im Vorjahr eine deutsch-österreichische Kundschaft ins Karakorum geführt hat, wandte sich gegen eine Entschließung des Deutschen Geographentages, die in scharfer Form von den Antarktisplänen des Münchener Arztes abrückt und von „Geltungsbedürfnis" und „Rekordsucht" gesprochen hat.

Auf einer Pressekonferenz betonte Herrligkoffer, ihm komme es darauf an, daß überhaupt eine deutsche Mannschaft an dem wissenschaftlichen Großangriff auf das Südpolarland beteiligt sei. Schließe sich Deutschland aus, so habe es keinerlei Möglichkeiten, politische oder wirtschaftliche Ansprüche auf Teile der Antarktis mit ihren ungeheuren Bodenschätzen geltend zu machen. Auch die Bundesregierung solle das würdigen und sich an der Finanzierung der Expedition beteiligen.

Ausgangsbasis für die Südpol-Expedition soll das Kronprinzessin-Martha-Land im norwegischen Sektor der Antarktis sein. Die norwegische Regierung habe bereits die Erlaubnis zur Durchführung der Expedition erteilt, erklärte Dr. Herrligkoffer. Für die Expedition, die im Abstand von 500 Kilometern mehrere wissenschaftliche Stationen auf der Route zum Südpol errichten will, sind 30 deutsche Wissenschaftler vorgesehen, und Herrligkoffer beabsichtigt, im Hauptlager eine ständig besetzte deutsche Antarktisstation zurückzulassen.

Die Kosten für das ganze Unternehmen beziffert Herrligkoffer auf zwei bis drei Millionen D-Mark, ohne den Spezialeisbrecher, die Hubschrauber und Langstreckenflugzeuge, die sich die Expedition chartern will. Bis zur Stunde verfügt Herrligkoffer noch über keine Mittel, die nur durch Spenden und Schenkungen aufgebracht werden können. Bis zum Ende dieses Jahres will der Münchener Arzt die Wissenschaftlergruppe zu einer Mannschaft zusammengestellt haben. Die Antarktis ist erst in ihren Randgebieten bekannt und birgt angeblich alle Bodenschätze, die heute die Erde zu vergeben **hat.**

O. T. 9.8.55

Figure 4. Newspaper article about Herrligkoffer's South Pole plans[14].

In a local newspaper his plan was described in military metaphors as participation in a "major scientific attack on the South Polar Land" to represent German claims. But Herrligkoffer's controversial personality, described as someone who craved records and admiration, led to strong opposition from the geographical community in West Germany. Scepticism about his plan and warnings about his personality were made public in various newspapers[15]. Ultimately he could not realise his very ambitious, but -due to the costs- totally unrealistic plan.

[13] Anon. 9.8.1955.
[14] Anon. 9.8.1955.
[15] Anon. 8.8.1955, see also Lüdecke 2007.

Military Context of the IGY

In January 1956, strategic aspects of the IGY expeditions returned to popular consciousness, when headlines announced the start of a major offensive against the South Pole by the Russians in context with the wish of the Kremlin to rearrange Antarctica (Fig. 5)[16].

Freitag, den 13. Januar 1956 Nr. 20 785

Großangriff auf den Südpol hat begonnen

Kreml will „Neuordnung" der Antarktis — Nicht nur die Forscher sind interessiert — Geophysik hat strategische Aspekte

is Canberra. Der Großangriff auf den Südpol hat begonnen. Im Zusammenhang mit dem dritten internationalen Geophysikalischen Jahr sind die ersten drei Forschergruppen bereits in der Antarktis eingetroffen. Es sind je eine Vorausabteilung der britischen und der amerikanischen Expedition und — zahlenmäßig die größte Gruppe — ein sowjetisches Vorkommando. Ein zweites sowjetisches Expeditionsschiff wird schon in den nächsten Tagen am Südpol erwartet. Damit unterstreicht Moskau, welche Bedeutung es einer Art „Neuordnung" am Südpol beimißt. Denn darüber ist man sich in aller Welt einig: Die Antarktis-Forschung hat auch eine politische Seite.

Moskaus Absicht, bei der Erforschung des sechsten Erdteils ein gewichtiges Wort mitzureden, entspringt der gegenwärtigen Situation, die dem Kreml kein Mitspracherecht in territorialen Fragen dieses Gebietes einräumt. Vor allem nehmen die Russen Anstoß an der „selbstgerechten Aufteilung des antarktischen Kuchens in einen norwegischen, englischen, australischen, neuseeländischen, französischen und amerikanischen Sektor. Die Russen rechtfertigen ihren Mitbesitzeranspruch nicht nur mit ihrem frühen Anteil an der Entdeckung der Antarktis. Sie stehen auf dem Standpunkt, die im Nordpolgebiet angewandte Sektoreneinteilung könne keinesfalls als Richtschnur dienen, denn geographisch gesehen weise die Antarktis — im Gegensatz zum Nordpol — keine direkten Anliegerländer auf.

Nun, es gibt solche Länder tatsächlich nicht. Selbst wenn man nach dem im Norden angewandten Rezept von den jeweils östlichsten und westlichsten Grenzpunkten Argentiniens/Chiles, Südafrikas, Madagaskars (zu Frankreich), Australiens und Neuseelands Linien zum Südpol zöge und die entstehenden Sektoren diesen Staaten zuteilte, bliebe weit über die Hälfte der Antarktis „herrenlos". Die Aufteilung des „freien" Gebietes unter die übrigen Länder entspräche jedoch immer noch nicht den Wünschen des Kreml. Was Moskau will, ist eine internationale Verwaltung des gesamten Südpolgebietes. In diesem Punkte decken sich die sowjetischen Wünsche mit früheren amerikanischen Vorstellungen. Obwohl Besitzer eines nicht kleinen Sektors, haben die USA die gegenwärtige Lösung nie als der Weisheit letzten Schluß betrachtet und ihr deshalb bis dato die De-jure-Anerkennung versagt. Erst die politische und militärische Rivalität zwischen Washington und Moskau hat die USA veranlaßt, den jetzigen Zustand de facto hinzunehmen, um es mit seinen am Südpol bereits vertretenen Alliierten nicht zu verderben. In einer Welt ohne Spannungen müßten daher die USA und Rußland hinsichtlich der künftigen Verwaltung und wirtschaftlichen Erschließung der Antarktis logischerweise Bundesgenossen sein.

Eine wenig beachtete Internationalisierung eines Teils der Antarktis ist übrigens im „internationalen Walfang-Abkommen" bereits verwirklicht. Konnte man sich aber in der gemeinsamen Ausbeutung der antarktischen Gewässer noch einigen, so entfiel eine ähnliche Regelung für das Festland mit dem Augenblick, in dem dieser „Kontinent" Eingang in die Planungen der Generalstäbe fand. Abgesehen davon, handelt es sich bei der Antarktis auch um eine „Schatzkammer voll märchenhafter Reichtümer" (Admiral Byrd). Die bis jetzt entdeckten 170 verschiedenen Rohstoffarten umfassen auch erstklassige Kohle, Eisen, Kupfer, Zink, Blei, Silber, Gold, Graphit, Petroleum und Uran.

Der kürzeste Flugweg von Südamerika nach Australien und von Südafrika nach Neuseeland führt direkt über den Pol. Die USA und ihre beiden pazifischen Verteidigungspartner Australien und Neuseeland können sich bei einem Ausfall der pazifischen Flugstützpunkte nur noch über den Südpol erreichen. Bewegliche Basen (Versorgungstanker) im südlichen Eismeer gaben den deutschen U-Booten bereits während des zweiten Weltkrieges einen erheblich erweiterten Aktionsradius. Der vom Suezkanal und vom Mittelmeer vorübergehend ausgeschlossene alliierte Versorgungsverkehr mußte auf der klassischen Kap-Route zwischen Australien und England empfindliche Verluste hinnehmen. Unter diesen Aspekten darf man ruhig auch dem russischen Interesse am Südpol strategische Überlegungen unterstellen.

Darüber hinaus kann es sich die Sowjetunion leisten, bei ihren Ansprüchen auch auf folgende Fakten hinweisen: Eine unter der Führung der Admirale v. Bellinghausen und Lazarew am 24. Juli 1821 nach 751 Tage langer Reise mit den Seglern „Mirny" und „Wostok" nach Kronstadt zurückgekehrte Expedition hatte im Südlichen Eismeer neben der Entdeckung zahlreicher Inseln auch das Vorhandensein eines zusammenhängenden Kontinents bewiesen. Niemand im Westen hat den Russen diesen gewichtigen Anteil an der Entdeckung der Antarktis bisher streitig gemacht. In einer von der „Geographischen Gesellschaft der UdSSR" am 10. Februar 1949 verfaßten Resolution wurde daher jede Regelung der territorialen Kontrolle des Südpolgebietes ohne die Mitwirkung der Sowjetunion abgelehnt. Die Lösung solle vornehmlich von den Staaten gefunden werden, die ein historisches Recht an ihrer Ausarbeitung hätten.

Das Wettrennen um die Schätze des Südpols und seine Einbeziehung in die strategischen Planungen ist der Ausdruck einer nach neuen Rohstoffquellen hungrigen und zugleich politisch zerrissenen Welt. Nur wenn es gelänge, die politischen Spannungen auszuräumen, scheint eine gerechtere Beteiligung der Nationen an den Rohstoffschätzen der eisigen Einöde denkbar. Vielleicht kommt Engländern, Russen und Amerikanern jetzt dort in der Antarktis im gemeinsamen Kampf gegen klirrenden Frost und andere dem Menschen feindliche Naturgewalten die Einsicht, daß dies die vornehmste Aufgabe der großen Völker, ihrer Politiker und Forscher ist.

Figure 5. Newspaper article about the "Major attack on the South Pole has started"[17].

The scientific question of whether Antarctica was a continent or an archipelago of large islands was discussed also at that time[18]. Once again a new race to the South Pole was described also referring to quarrels about the mineral resources which were presumed to exist under the ice cover[19]. The IGY bureau, the "Comité Spécial de l'Année Géophysique Internationale" (CSAGI) in Paris was concerned about the sudden interest of great powers in the south polar region

[16] Anon., 17.1.1956.
[17] Anon. 17.1.1956.
[18] Fett 1956.
[19] Anon. 9.2.1956.

causing quarrels and consequences on the diplomatic circles. There was even talk of Antarctica as a possible launching base for intercontinental rockets. The popular German magazine *Stern* (Star) described a "Cold War in Antarctica", in which Americans and Britons together wanted to challenge the superiority of the Russians in this arena (Fig. 6)[20]. Also the future of Antarctica as strategic geographical element in military operations was highlighted for instance by using the word "bases" instead of "stations", as scientists would have said. The journalist argued that the Americans wanted to occupy "new strategic key positions and preferably the largest part of the immense mineral resources", thus making Antarctica "the newest centre in the battle of Great Powers for resources of raw materials and better military positions"[21].

Figure 6. Magazine article about the "Cold War in Antarctica"[22].

In due course, a new press release reported about the first five villages (!) with altogether 400 inhabitants in effect manifesting territorial claims in Antarctica, and that depots were set for the Commonwealth Trans-Antarctic Expedition of 1957/58[23]. The story was illustrated by three maps

[20] Stern 1956.
[21] Stern 1956.
[22] Stern 1956.
[23] WP 1956.

(Fig. 7), two of them showing the Antarctic continent with reference to the Mediterranean Sea and the territorial claims. The biggest map depicts the locations of the American, British, Russian and other bases in Antarctica.

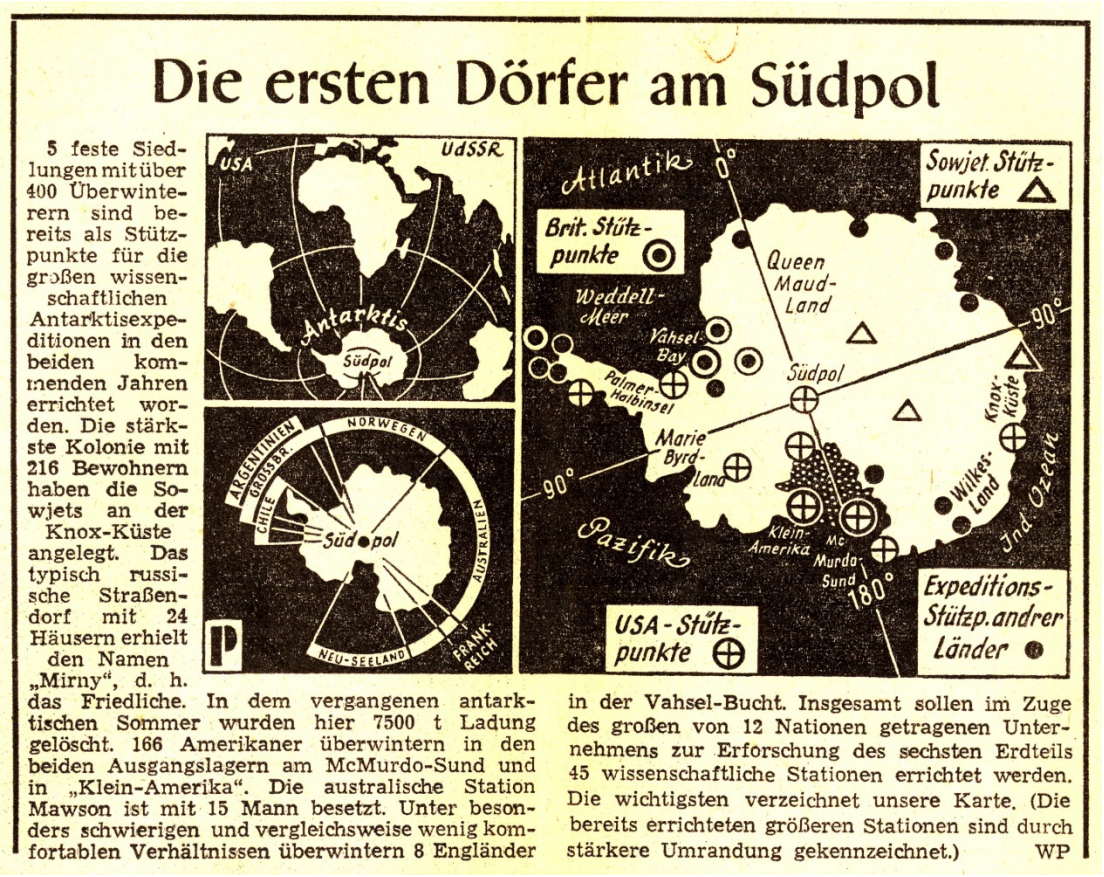

Figure 7. Location of the first villages in Antarctica. Circle with cross: American bases; circle with dot: British bases; triangle: Russian bases; black dot: bases of other nations[24].

A dynamic military type chart with the South Pole as general target in the centre underlined the military aspect in the spirit of the time (Fig. 8)[25]

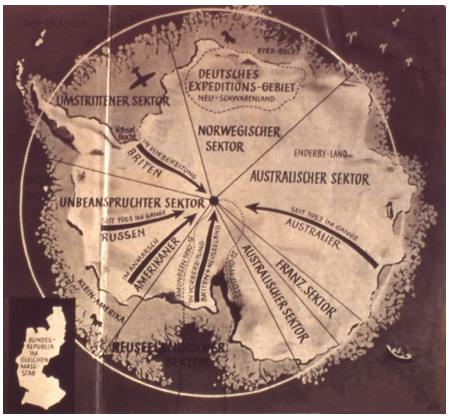

Figure 8. Attack of the South Pole from all sides except from the Norwegian and French sector[26].

The map shows the domain of the German expedition (Neu-Schwabenland) in the Norwegian sector. The arrow towards the South Pole in the Australian sector in the east indicates that the advance has been underway since 1952. In the New Zealand sector, the joint British and New Zealand advance from the Ross Sea between the historical routes of Robert Falcon Scott (1868-1912) and Roald Amundsen (1872-1928)

[24] WP 1956.
[25] Neue Post 1956.
[26] Neue Post 1956.

is labelled "in preparation". This refers to the Commonwealth Trans-Antarctic Expedition. The Americans starting from their station at Little America on the western side of the Ross Sea are already "advancing", while the Russian activities are placed in the unclaimed area of the Pacific sector of Antarctica and their advance is described as underway since 1955. This is an interesting misinterpretation of the facts, because the Russian expedition never went to that region but started in the Australian sector on the opposite side and marched towards the Pole of Inaccessibility. But the author thought in terms of a possible Russian occupation, which naturally only could take place in an up to then unoccupied area. Finally the British route was in preparation close to Vahsel Bay discovered by the 2nd German Antarctic Expedition (1911-1912) in the debatable area of Argentine, British and Chilean claims.

During the public dispute about the distribution of this "gigantic ice cake" newspapers considered that (West) Germany had a legitimate right to be taken into account in the partition of Antarctica, not at least because it had made significant geographical discoveries in 1939[27]. A "Future vision of coal, ore, uranium and oil" was promised on 12 February 1957, based on the already well-known results from Byrd's second expedition (1933-1935)[28]. In contrast to former articles it was now explained that the economic problems of mining were not yet solved, which implied it was not too disadvantageous for the FRG not to be involved in the current Antarctic activities.

Americans and Russians as Antarctic Rivals

In January 1957 a West German magazine headline announced a "Final battle for the South Pole" between America and Russia[29]. While the claims to possession were in full swing, the impression was given of science being used to cover the power-political and economic-political race to the South Pole between America and Russia, or between American expedition chief Admiral Byrd and his opponent, the Russian expedition chief Somov. When political circumstances during the Cold War intensified scientific expeditions were more and more described as military operations. For example, the German journalist Heinz Steinitz, then living in New York, published a report in five parts in the nationwide newspaper *Süddeutsche Zeitung* about his journey to Antarctica (February - April 1957) as a guest aboard the American expedition ship "Curtiss". The headline „Fortress Antarctica will be surrounded" and subtitle "Researchers from twelve nations and an army of international help troops run the white ramparts of ice and rock" capture the style of Steinitz's reporting[30]. He had a "complete Antarctic uniform" in his luggage when he boarded the "Curtiss" in Christchurch, which - in his eyes - seemed to be an area "behind the front". This idea originated in Byrd's recent naval part of the IGY expedition known as operation "Deep Freeze" (1955/56), which used Christchurch as "supply station" and "operations base". Steinitz even termed the earlier big Antarctic expeditions as "triumph of science", which recalled Leni Riefenstahl's famous movie "Triumph of the Will" about the NSDAP convention at Nuremberg in 1934.

Steinitz described the unique situation of a peaceful international collaboration with a so-called planning "scientific general staff" in the hinterland and with professors holding the authority,

[27] Anon., 6.9.1956.
[28] Steinitz 1957a.
[29] Deutsche Illustrierte 1957.
[30] Steinitz 1957a.

while governments and armies became an auxiliary supplier of material. In this setting the military machine was reduced to an executive instrument of the scientific high command forming the "modern big army". It was prepared "to deliver the deciding trial of strength". The whole article reflects the significant military support for science especially in US operations. But Steinitz also made the remark that Antarctica fought back with its own weapons of ice, snow, crevasses, and blistering storms and already had taken some human lives. Antarctica was a continent with a strong connotation to "demonstrating power" and weakening the "faith of victory of the human aggressor".

The first part of the newspaper series was accompanied by a comic style map, oriented in such a way as to allow the reader to follow the direction of the Commonwealth Trans-Antarctic expedition from the Weddell Sea to the Ross Sea (Fig. 9).

Figure 9. Comic style map of the activities in Antarctica during the International Geophysical Year 1957-1958[31].

The headline of Steinitz's fourth report stated that "The eternal ice is not yet distributed" and that national claims were withdrawn for the moment[32]. Nevertheless he mentioned that military experts were discussing the strategic importance of Antarctica in the future. Another reporter of that time labelled Antarctica as a "treasury in night and ice", which had triggered a race of

[31] Steinitz 1957a.
[32] Steinitz 1957b.

nations to the South Polar continent, while the IGY was seen as an "invasion of scientific expeditions"[33].

Finally Steinitz used his material to publish a book about the seventh Continent (!), harking back to Wilhelm Filchner's (1877-1957) travel account of the 2nd German Antarctic Expedition (1911-1912) with the title "To the sixth Continent" in 1922[34]. Concepts of the continents Eurasia and America obviously had changed in the meantime resulting in different ways of counting. Besides a description of expeditions and everyday life in Antarctica during the IGY, Steinitz addressed the new major question "Why fight for Antarctica?" in 20 pages. He argued that it made sense to use Antarctica as "living space" ("Lebensraum"), which had been an essential concept during the Third Reich, and also as a base of natural resources [35]. It would thus be justified to think about the continent's future. He repeated old arguments, already well-known from the Third Reich: the explosive pressure of increasing population forced the habitation of new grounds, which seemed to be only realistic close to the shore line of Antarctica. Up to then the armistice was not broken during the IGY, but Steinitz continued to describe the uncomfortable feeling that "nothing but the word of honour of a handful of university professors preserve the icy continent from the intervention in the world wide arms race"[36]. This chapter culminated in the question. "To whom does Antarctica belong and what is it going to become?"[37] The author saw the solution in the fatal decision between life and death, decline and preservation of the human race. Consequently Steinitz did not give a chronology of Antarctic exploration in the appendix, but a chronological list of political events concerning claims referring to the sub-Antarctic Islands and Antarctica.

The Commonwealth Trans-Antarctic Expedition

When the Commonwealth Trans-Antarctic Expedition was going to start the polar crossing at the end of December 1957, the newspaper *Bonner Rundschau* from the capital of the FRG began a 14-part series titled "With the Everest conqueror to the South Pole"[38]. It was written by Noel Barber from the London *Daily Mail* and translated for German readers. Barber had a chance to go to the American McMurdo Base at the Ross Sea and to visit the Amundsen-Scott Base at the South Pole, established by the USA in August 1957 as part of the American IGY program. In the first articles of his series, Barber introduced the idea of a "race" to the South Pole between the Commonwealth Trans-Antarctic Expedition and - as Steinitz called it - the New Zealand South Polar Expedition, which had the task of depot laying for the crossing (Fig. 10).

Figure 10. Line of approach of Fuchs' expedition from the Weddell Sea and Hillary's expedition from the Ross Sea. The originally planned meeting of both expeditions should have taken place at Depot 700 (km)[39].

DIE MARSCHROUTEN der beiden Expeditionen. Sir Edmund Hillary will die Fuchs-Gruppe jetzt im „Depot 700" (Pfeil) erwarten.

[33] Dröscher 1957.
[34] Steinitz 1959, Filchner 1922.
[35] Steinitz 1959: 220pp.
[36] Steinitz 1959: 236.
[37] Steinitz 1959: 236.
[38] Barber 1957.
[39] Barber 1958b.

In his second article Barber focussed on the Russian expedition, which he labelled as a "general mobilisation of the Soviets" for the exploration of Antarctica to manifest their possessory claims[40]. He saw the Russian research within the IGY as make-pretend to bring a huge amount of equipment onto the Antarctic plateau and to hoist flags with hammer and sickle on the white continent. This effort was carried through with a huge expenditure. Barber described their base "Mirny" in the so-called Australian sector of Antarctica as real town (!) with the best accommodations and highest standard of living. Although the Russians had promised to remove this base after the finish of the IGY, Barber's impression was that the Russians might stay.

Besides this strategic perspective in a global context with Cold War, journalists were very happy when the Trans-Antarctic Expedition turned into an adventure story with two protagonists. On the one hand there was the depot expedition led by the conqueror of Mount Everest, the New Zealander Sir Edmund Hillary (1919-2008), who would become the third person to arrive at the South Pole on land and, on the other hand there was his fellow expeditioner, the British Dr. Vivian Fuchs (1908-1999), whose start from the Weddell Sea coast unfortunately was delayed. Additionally his scientific investigations of the ice thickness by seismic measurements slowed Fuchs down, because they took much more time than intended due to crevasses and other barriers. However the idea of a race between both expeditions had not at all been Fuchs' original intention, but was a real gift for the press.

In his sixth report Barber mentioned the start of a "Cold War" between Hillary and Fuchs[41]. Hillary had made an unplanned and rapid advance to the South Pole, which he reached on 2 January 1959 instead of waiting at the depot camp as planned. Hillary defined 19 January 1958 as the date of no return, because then only four weeks would be left to finish the crossing i.e. to accomplish the last 2.000 km before the onset of the Antarctic winter. However, Fuchs had rejected Hillary's idea that due to the slowness and delay of his own party they might have to winter over at the South Pole and continue the crossing of Antarctica the following spring. In response Hillary refused to meet the Fuchs at Depot 700 to guide him to McMurdo at the Ross Sea in the short remaining time (see Fig. 10), which he called "foolish, daredevil, and risky". Finally the dispute was settled by his announcement to guide Fuchs during the last part of the crossing[42] . Consequently, from the eighth report of 11 January 1958 onward the series focused on the British under the new title "Station South Pole waits for Dr. Fuchs"[43].

In the tenth part of the series a new aspect emerged, when Barber reported about the Russians who now attacked "their" South Pole, the prestigious Pole of Inaccessibility (Fig. 11)[44]. In this context Barber repeated the notion of a general Soviet mobilisation at the beginning of 1958 to participate in the exploitation of the polar region.

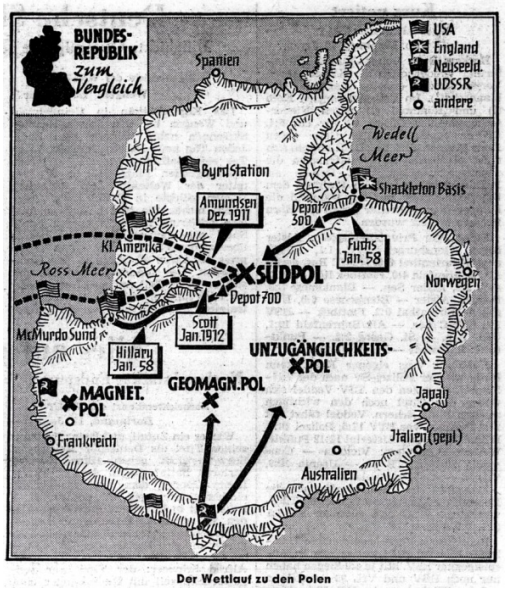

Figure 11. Map showing various tracks to different Poles on Antarctica[45].

[40] Barber 1958a.
[41] Barber 1958c.
[42] Barber 1958d.
[43] Barber 1958e.
[44] Barber 1958f.

At the same time, Hillary's unplanned and rapid advance towards the South Pole seemed to be a clear 'declaration of war' and a human drama between Fuchs and his rival[46]. Nevertheless Barber pleaded in Hillary's favour that it was well-known in Antarctica that Fuchs had made some psychological mistakes in his behaviour. In the end Fuchs arrived at the South Pole just in time on 19 January 1959 and - what a surprise - everybody had the impression that he was "the absolute chief of the expedition, radiating intelligence and serenity"[47]. Immediately Hillary's insubordinate behaviour was totally forgotten, when the new star was born.

West German Books on Polar Research

Besides the current reports from Antarctica in newspapers and magazines, many books were also published on polar research in both East and West Germany. In the FRG, the geographer Hans-Peter Kosack (1912-1976) had collected information to write the first scientific regional geography of Antarctica in the German language, when he was working on the revision of the map of Neu-Schwabenland and on the production of a new map of Antarctica[48]. His book chapters referred to nomenclature[49], exploration, topography, climate, magnetism, the aurora australis, the Southern Ocean, glaciation, fauna and flora, as well as to economy, political claims, and human colonisation. In the main part Kosack gave a description of single Antarctic regions. He also addressed aims and tasks of future Antarctic research during the upcoming IGY, such as meteorological stations (preferably the cheaper automatic type needed for local weather forecasting), and magnetic measurements to improve navigation. A survey of the ionosphere causing faults in wireless telegraphy might also have practical utility, and oceanographic investigations concerning whaling in the Southern Polar Sea were mentioned as well as prospecting for mineral resources. Consequently he mentioned the demand for international co-operation to support the different investigations.

Kurt Hassert (1868-1947), an expert on colonial and economic geography, had prepared an analysis of polar research and the history of expeditions to the North and South Pole before he died in 1947. Unfortunately the finished make-up of the book was a victim of the aerial warfare during WW II. Finally it was published posthumously in 1956, at a time when German readers were eager to learn more about the unknown continent due to the upcoming IGY[50]. Before his death in 1947, Hassert stated that "science, commerce, and politics were similarly interested in polar research. However the practical success will have to stand behind the scientific profit." Ten years after Hasserts's death ideas may have changed.

The second volume with the results of the "Schwabenland" expedition of 1938/39 and Kosack's final revision of the Neu-Schabenland map was published in 1958 and considered to be a "German contribution" to the IGY 1957-1958[51]. Besides, geologist and geographer of the "Schwabenland" expedition Ernst Herrmann (1895-1970) contributed a popular book about "The

[45] Rost 1958.
[46] Barber 1958g.
[47] Barber. 1958h.
[48] Kosack 1955.
[49] See also Lüdecke 2009 in print.
[50] Hassert 1956.
[51] Ritscher 1958.

Poles of the Earth" in terms of science, military and transport policy[52]. After a discussion of geographical aspects and a short history of polar exploration, he devoted a whole chapter to the discovery of Neu-Schwabenland and its role after World War II. The growing general interest in Antarctica since WW II was obvious, because this area would perhaps become the "deployment zone of the next world war".[53] Despite the Cold War the "largest trans-national co-operation of scientists of all civilised nations of the earth would take place during the IGY"[54]. Dealing with both Polar Regions Herrmann emphasised the contrast between the American station at McMurdo (Ross Sea) and the Russian drift station North Pole 6 in the Arctic Ocean. Finally Herrmann included the start of the first satellites highlighting the technical and scientific achievements of the IGY. He also mentioned the newly establish commercial flights of the Scandinavian Airline SAS from Copenhagen via Søndre Strømfjord in Southwest Greenland and Winnipeg to Los Angeles. Finally 24 February 1957 marked the opening of the regular airline Copenhagen - North Pole - Tokyo. Herrmann cited a participant of the first flight, the Danish prime minister Hans Christian Svane Hansen (1906-1960), who recognised the new airline as a means to improve the contact between nations and to serve the universal peace and human progress[55].

East German Books on Polar Research

In the German Democratic Republic (GDR) a chronological account of the most important expeditions to Antarctica and an outlook upon the upcoming IGY was published under the title "The High Pole - The History of Exploration of the Terra Australis" in 1956[56]. Starting with a report of a modern Russian whaling cruise the author directed attention to the discovery of the "terra australis incognita", which had been driven by economic ideas. Exciting reports of Cook's and Bellingshausen's journeys (1772-1775 and 1819-1821 respectively) triggered whaling and the 'magnetic crusade' of the 1840's. Descriptions of the following eras of the international co-operation at the turn of the century including Erich von Drygalski's 1901-1903 expedition, which discovered Wilhelm II Land, and the race to the South Pole in 1911-1912, including Filchner's 1911-1912 expedition to the Weddell Sea, as well as how the new era starting with Byrd's flights in Antarctica (1928-1930) led to the announcement of the IGY. Very interesting maps of two to five expedition routes of special periods illustrate the book. A map of Neu-Schwabenland, discovered by the 3rd German Antarctic expedition under the National Socialist regime in 1938/39 was given also, but no report about the expedition itself, which conducted the first extensive aerial photogrammetric survey of the mountains in Dronning Maud Land, which the Germans called Neu-Schwabenland. The book ended with the expectation that according to the Soviet occupying forces "the results achieved under the guidance of Soviet science will contribute to the peaceful advance and welfare of all mankind."[57]

A regional organised account of the discovery of the different regions of the Arctic prior to 1938 was published by the same author under the title "The White Way - Researchers Conquer the

[52] Herrmann 1959.
[53] Herrmann 1959: 7.
[54] Herrmann 1959: 7.
[55] Herrmann 1959: 82-83.
[56] Förster 1956.
[57] Förster 1956: 436.

Arctic"[58]. The book was organised thematically starting with a chronological description of single steps towards the discovery of the Northwest Passage, the investigation of Greenland ending with Alfred Wegener's death on the interior ice cap in 1930, Inuit living in the North American Arctic, the description of the discovery of the Northeast Passage and Nansen's drift on his ship "Fram" before discussing modern flights over the Arctic. This was in line with the general importance of aviation within to Soviet propaganda about the Arctic in the 1930s[59]. There was neither a chapter on the conquest of the North Pole or Cook and Peary nor a special chapter describing native people living in the Russian Arctic (Siberia). Instead the author focused on the drift of the Russian ship "Sedow" in 1937/38 and on recent Russian achievements in Arctic settlements, which might strengthen the Russian advantage in the exploration of Antarctica[60]. The book ends with a praise of Russian Arctic aviation. A description of the equipment used by the discoverers, a natural history of the Arctic, various maps showing the most important expedition routes were presented and like in his first book on Antarctica he added a chronological table of most important expeditions.

Finally another book came out in the GDR in 1959 titled "Under the spell of the White Magnet"[61]. The chronological description started with the ideas of the old Greeks and passed by the usual scientific and personal achievements of the discoverer like Vitus Bering (1681-1741) and Adam Johann von Krusenstern (1770-1846) in the north and James Cook (1728-1779) or Fabian Gottlieb von Bellingshausen (1778-1852) in the south. It acknowledged the international co-operation of 1901-1904, which had been initiated in Germany, and described the first flights in Antarctica and sovereignty claims of the 1940s. The map of most important expeditions of the period 1898-1912 included also Drygalski's and Filchner's expeditions. In the chapter on "Fight for the no-man's land" "an apple cake was distributed" - a German metaphor connecting the single Antarctic sectors of national claims to slices of a sweet apple cake[62]. Then the author gave a critical account of the "Schwabenland" expedition from the East German point of view using military terms under the subtitle "Göring's pledge". The IGY was described in terms such as the "general offensive of science" and the "mobilisation of an army". For the investigation of the "retreat" of the southern ice an "initial position" was taken at the Russian station "Mirny". The unchanged presence of military terms may have reflected the daily presence of Soviet military in East Germany.

It is possible that the enormous size of Operation Highjump in 1946/47, which was designed to train the US Navy in polar operations in the event of a possible war in the Arctic, may have been the origin for using military terms in connection with research and interest in Antarctica. This had not been the case with the German "Schwabenland" expedition of 1938/39, which had been organised by the Four Year Plan under Field Marshal Hermann Göring.

Given the ongoing Cold War it is not entirely surprising that German newspapers or popular books focused on adventure, on mineral resources, and on the possible significance of Antarctica from the military perspective. However, East German books seem to give more accounts of adventure stories than West German books, which are more like textbooks and provide analyses.

[58] Förster 1957.
[59] McCannon.
[60] Förster 1957.
[61] Wille 1959.
[62] Wille 1959.214pp.

The differences in the character of the debate about Antarctica may be have been influenced by the different actual background situations of the two German parts east and west of the "iron curtain", which was replaced by "the wall" from 1961-1989: The traditional science oriented FRG on one side contrasted to the then Soviet oriented GDR on the other side looking for socialist heroes to strengthen the young state of East Germany.

Acknowledgement

For the analysis of newspaper and magazine clippings I used the collection of Ernst Herrmann (Bonn) and Hans Gazert (Garmisch-Partenkirchen), which were made accessible by their descendants. Without their support the analysis presented would not have been possible.

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Barber, N. 1958d. Mit dem Everst-Bezwinger zum Südpol. (R)-Sonderberichterstatter Noel Barber meldet: Flug und – „Kleinholz" funkt Fuchs. *Bonner Rundschau* of 9.1.1958

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BRITISH ANTARCTIC SCIENCE, 1939-1959

Adrian Howkins

Abstract

This paper explores the relationship between British Antarctic science and British Antarctic policy between 1939 and 1959. During this period, Britain was engaged in an active dispute with Argentina and Chile over the sovereignty of the Antarctic Peninsula region. This paper identifies three phases in the relationship between British Antarctic science and British Antarctic politics over this time. For most of the period 1939-1959, British officials drew on the established idea of "environmental authority," and used the self-proclaimed superiority of their "pure science" research in Antarctica to justify their sovereignty claims. During the International Geophysical Year (IGY) of 1957-58, however, the actual results of scientific investigations in Antarctica helped to bring about a shift in British Antarctic policy: with the continent looking increasingly less likely to be of economic value the British came to favor a limited internationalization of the continent. Having taken this decision, the British, in conjunction with other countries, exploited the rhetoric of scientific internationalism to push for the signature of the 1959 Antarctic Treaty. Implicit to this overview of British Antarctic policy between 1939-1959 is the argument that Antarctic science was both a flexible rhetorical device, and a genuine attempt to understand the Antarctic environment.

Introduction

In seeking to explain Captain Scott's tragic failure to beat Roald Amundsen to the South Pole during the heroic era of Antarctic exploration, the British often resorted to the claim that the Scott's party had been conducting useful scientific research in contrast to the Norwegians' simple "dash for the pole." During this early period of continental exploration, the British saw science as justifying their polar expeditions: heroism facilitated science at the same time as science justified British activities in the southern continent.[1] Throughout the heroic era, British took pride in their Antarctic scientific achievements alongside their manly accomplishments. The romantic notion of "conquering nature" by walking across it complemented the modernist notion of "conquering nature" through scientific understanding.

This paper will focus on the period from 1939-1959, more than two decades after the end of the heroic era. By this time, British Antarctic science already had a long and complicated history, encompassing the heroic era and dating back to Captain Cook's maritime expeditions of the late eighteenth century. Britain's polar experience also drew upon extensive scientific work and exploration of the Arctic throughout the nineteenth century.[2] The 1940s and 1950s, however, marked a new era for British Antarctic Science. During this period, Great Britain was involved in an active dispute with Argentina and Chile over the sovereignty of the Antarctic Peninsula, and scientific activity took place within the context of this dispute. An examination of British Antarctic Science from 1939-1959 therefore offers an excellent opportunity to study the relationship between Antarctic science and imperial sovereignty claims.

[1] Jones (2003: 10)
[2] Hill (2008)

The British Empire had formally claimed the Antarctic Peninsula region in 1908, in an effort to tax and regulate the nascent whaling industry.[3] Although the exact area of the land within this region was not known at the time, the provocatively named "Falkland Islands Dependencies" would turn out to be the largest territory under the jurisdiction of the British Colonial Office. In the early years of the Second World War, both Argentina and Chile formally asserted their own overlapping claims to sovereignty in the Antarctic Peninsula, citing rights to the region dating back to the Treaty of Tordesillas of 1492.[4] The dispute over Antarctic sovereignty quickly became caught up in wider nationalist struggles against European imperialism, and on several occasions threatened to turn violent. The active period of the dispute would last for the next twenty years, until the disputing countries effectively agreed to disagree about sovereignty as part of the signature of the Antarctic Treaty in 1959.

Scientific research played a central role in the active phase of the dispute from 1939-1959. Both Argentina and Chile sought to incorporate the results of scientific research into their respective cases for Antarctic sovereignty.[5] The two South American countries argued, for example, that the apparent geological continuation of the Andes Mountains into the "Antarcandes" of the Antarctic Peninsula, gave them political rights to "South American Antarctica." The Argentines could also draw upon the longest continuous series of meteorological records from Antarctica, obtained at their meteorological station in the South Orkney Islands. In opposition to these claims, the British asserted that they could better understand, and better use, the natural environment. British claims to Antarctica epitomized much wider claims to "environmental authority," an idea that was encapsulated in the idea of improvement.[6] By conducting more scientific research of a greater quality than their South American rivals the British hoped to convince the world of their rights to govern the southern continent, so they claimed, "for the good of humanity."

There is little remarkable in the simple claim that Britain used science to support their claims to Antarctic sovereignty: this was a strategy that the British employed throughout their empire, and their South American rivals were doing the same. Just as with studies of Argentine Antarctic Science and Chilean Antarctic Science over the same period, the interest lies in the precise nature of the interaction of science and politics, the differences between the three rivals, and the way in which this interaction changed over time. Until the IGY of the 1957-1958, the British used the rhetoric of science and in particular their self-proclaimed superiority of their scientific achievements, to back their claims to exclusive sovereignty in the Antarctic Peninsula. But British scientific research in Antarctica was more than just a rhetorical strategy. During the IGY, the results of scientific research in Antarctica, influenced decision making towards the continent and contributed to Britain's decision to push for the signature of the Antarctic Treaty in 1959. The British then flipped their scientific rhetoric on its head, and rather than using science to back their claims to exclusive sovereignty, they used the ideal of scientific internationalism to push successfully for a partial internationalization of the Antarctic continent. The central argument of this paper is that science used for political purposes does not stop being science, and that the scientific results of politically motivated science had political consequences.

[3] Tønnessen and Johnsen (1982)
[4] The Treaty of Tordesillas divided the world from pole to pole into spheres of Spanish and Portuguese interest
[5] Howkins (2006); Howkins (2007)
[6] Drayton (2000)

This paper will be divided into four sections. The first section will introduce the idea of "environmental authority" and discuss the broad relationship between science and the British Empire into the middle of the twentieth century, especially as it related to Antarctica. The second section will examine Britain's reaction to Argentine and Chilean sovereignty claims, and the ways in which the British responded to this challenge to British scientific authority by increasing their scientific activities in the Antarctic continent. The third section will switch the question around and look at the impact of developing scientific understanding on British policy making. This was especially important during the IGY of 1957-58. The final section will investigate the ways in which Britain used science to push for a limited internationalization of Antarctica through the Antarctic Treaty in order to preserve British political influence in the continent.

British "Environmental Authority"

In September 1946, in a conversation with Gordon Howkins, the head of the Falkland Islands Meteorological Service, Brian Roberts, speaking as a member of the Foreign Office Research Department, explained the political reasoning behind meteorological work in the Falkland Islands Dependencies: "It is the wish of HMG to emphasize that the occupation of the FID should be such as to afford evidence of the exercise of sovereignty and that the programme of research and exploration should keep this in view. An active programme of research, which can be justified on scientific grounds alone, is an essential part of the preparation of a case which can be used if necessary to demonstrate to Foreign Governments of a Tribunal that HMG is taking all reasonable steps to develop and exercise sovereignty over the area, and is not merely attempting to prevent foreign encroachments. There is no doubt that both the Chilean and Argentine Governments would like to set up meteorological stations in the Dependencies for political reasons. It is essential therefore that while we have to exclude them from doing so we must take every possible step to ensure that we do not lay ourselves open to the same charge. Whilst FIDS was political in origin, it is important to maintain it as far as possible as a normal administrative activity in which motives of research, exploration and development predominate.[7]" By the mid-1940s, British Antarctic science had distinctly political purposes. An active program of scientific research helped to demonstrate Britain's "effective occupation" of the region, a legal principle for demonstrating sovereignty. A genuine scientific program also set the British apart from their South American rivals, who, the British implied held baser motives for their competing claims. In order to serve these political purposes, British Antarctic science had to be seen as non-political. Or, put another way, science that could be portrayed as "politically neutral" was more politically useful than science that had obvious political intentions.

Building upon Francis Bacon's early-modern assertion that knowledge of the natural world brings with it political power, historians of the British Empire have explored the broader connections between science, the environment, and imperialism. Authors such as Richard Drayton, David Arnold, and Richard Grove have shown how the British Empire used claims to scientific superiority both to facilitate and legitimate their empire.[8] Science provided some of the practical tools needed to govern and develop an empire, while at the same time providing a moral justification for doing so through the seminal idea of "improvement." Sometimes entire

[7] Roberts (13 September 1946) Emphasis in original
[8] Grove (1995); Arnold (1996); Drayton (2000)

academic disciplines, such as geography and anthropology, developed to serve imperial needs.[9] The term "environmental authority" offers a succinct way of describing this complex relationship: by claiming to be able to understand and control the natural environment, the British asserted political authority over large parts of the globe.

Antarctica offers historians an excellent location to explore the relationships between political power, scientific knowledge, and the natural environment, due to the relative simplicity of human-nature interactions in the continent. British claims to environmental authority in Antarctica arguably began with the voyages of Captain Cook in the late eighteenth century. But it wasn't until the so-called heroic era of Antarctic exploration at the turn of the twentieth century, that Antarctica began to capture the British scientific and popular imaginations. At the Sixth International Geographical Congress, held in London in 1895, delegates resolved that "the exploration of the Antarctic Regions is the greatest piece of geographical exploration still to be undertaken," and that "scientific societies throughout the world should urge, in whatever way seems to them most effective, that this work should be undertaken before the close of the century."[10] For imperial powers making assertions of environmental authority around the world, humanity's lack of knowledge about Antarctica was a cause of embarrassment.

During the heroic era, British scientists made significant contributions to the developing understanding of the southern continent. In this early stage of continental exploration, one of the first tasks was to survey the landscape. Alongside their more eye-catching attempts to get to the South Pole, British scientists did much valuable work around the continent's margins. The discovery of the McMurdo Dry Valleys on Scott's *Discovery* expedition (1901-04), is just one example of Britain's geographical contribution. On the other side of the continent, the Scottish National Expedition of William Speirs Bruce conducted valuable scientific work, including the establishment of a meteorological station on Laurie Island, which would produce the longest series of Antarctic weather data in existence following its hand-over to the Argentine government. There was, however, a feeling that the British could have done more purely scientific work. Figures such as Bruce, and the Australian Douglas Mawson felt that the fascination with the South Pole distracted from more useful work that could be done elsewhere. An official British report published in 1920 suggested that the British could have made a greater contribution to the scientific understanding of the Antarctic Peninsula region, where foreign expeditions were significantly more numerous than British ones.[11]

Perhaps most famously during this period, the British used the rhetoric of science to explain Captain Scott's tragic failure to beat the Norwegian Roald Amundsen to the South Pole in the austral summer of 1911-12. The British polar party, this argument went, had been conducting genuine scientific research en route, in contrast to the Norwegian's simple "dash for the pole." The arguments for and against this claim have been well documented in the extensive literature on Scott and Amundsen.[12] The case for the scientific defense of Scott often begins with the fact that the party was still man-hauling 35lbs of geological specimens when they died.[13] The case

[9] Godlewska and Neil (1994)
[10] Jones (2003)
[11] H.M.S.O. (1920)
[12] A particularly balanced account can be found in Jones (2003)
[13] Jones (2003:166)

against argues that since Scott followed the route to the pole pioneered by Ernest Shackleton, he did little to further geographical knowledge. Since there are strong arguments on both sides, it is unlikely that this debate will ever be resolved. But what is important is that the British explicitly turned to the rhetoric of scientific superiority in defending their fallen heroes.

In 1908, midway through the heroic era, the British made a formal sovereignty claim to the Antarctic Peninsula region. After making this claim, the British drew upon the rhetoric of science to justify their possession of the "Falkland Islands Dependencies." In the 1940s, Sir Miles Clifford, governor of the Falkland Islands would boast that Britain had taken possession of the Falkland Islands for the good of humanity. "The only true wealth that this area contains, so far as we know today, is still as in the past its marine wealth – its whales and seals; these, as we have noted earlier, could readily be exterminated by indiscriminate killing and it was the recognition of this danger which decided His Majesty's Government to bring there industries under control and lead to the establishment of British sovereignty over the area now known as the Falkland Islands Dependencies. The motive was a purely unselfish one, to conserve the harvest of these seas for the benefit of mankind as a whole."[14] Such claims were not uncommon, and would be echoed, for example, in Britain's unilateral submission of the sovereignty dispute to the International Court of Justice in 1955.[15] In order to demonstrate their scientific authority between the two world wars, the British instituted a program of oceanographic research known as the Discovery Expeditions. Other British scientific expeditions to Antarctica, such as that of John Rymill, can be seen from within a similar context. By the time of the beginning of the active dispute in Antarctica in the late 1930s, Great Britain already had an established tradition of using science to support its political claims.

Scientific Response to Argentine and Chilean Claims

In the early years of the Second World War, Argentina and Chile – both of which remained neutral throughout most of the conflict – actively asserted their sovereignty claims to the Antarctic Peninsula region. In November 1940, the Chilean Government issued decree 1747, which formalized its claim to the Antarctic Peninsula region. In the 1941-42 and 1942-43 seasons, the Argentine government sent expeditions to Antarctica, where landing parties planted flags in the ice and conducted ceremonies of possession. South American arguments for sovereignty that were based on geological continuity, geographical proximity, and shared weather and climate, can be thought of as a form of "environmental nationalism," which asserted shared geography as an argument for sovereignty. Additionally, Argentina in particular sought to beat the British at their own imperial game of environmental authority, drawing on the work of the Laurie Island meteorological station and other scientific research, in order to claim that they better understood the Antarctic environment. These various challenges posed an implicit challenge to Britain's imperialistic claims to environmental authority.

Initially, Britain's response to the South American claims was severely restricted by its participation in the Second World War. By 1943, however, the British government found itself in a position to send a secret expedition of "effective occupation" to the Antarctic Peninsula region. Known as Operation Tabarin, this Admiralty-led expedition would mark the beginning of a

[14] Clifford (22 February 1948)
[15] International Court of Justice (1956)

continuous human presence on the Antarctic continent that has lasted until today. From its outset, Operation Tabarin perpetuated the connection between science and politics, if in a slightly amateurish fashion. When government officials were looking for advice from people with Antarctic experience they inevitably turned to scientists such as J.M. Wordie and N.A. Mackintosh.[16] Despite the ongoing war, these scientists saw Operation Tabarin as a valuable opportunity to continue their scientific investigation of the southern continent, and they helped to put together a basic program of scientific research. Activities such as meteorological readings, mapping, and rudimentary "geologizing" in no way hampered the strategic objectives of the mission, and in fact offered a way of keeping the men, most of who were not scientists, occupied during the long polar winters.

In the immediate postwar years, Britain faced a renewed challenge to its claims to Antarctic sovereignty. In what might be termed a "Scramble for Antarctica," Argentina, Chile, and the United States all established bases in the Peninsula region.[17] Although the reoccupation of the United States East base by Finn Ronne proved to be temporary, the two South American countries sought to reinforce their earlier assertions of sovereignty with permanent demonstrations of their rights. These assertions of Antarctic sovereignty were closely connected with the nationalist agendas of Juan Domingo Perón in Argentina and Gabriel González Videla in Chile. In February 1948, President Videla became the first head of state ever to visit Antarctica, thereby demonstrating the importance of the Antarctic Question to the domestic politics of his country, at least as a distraction. During this period there was also a renewed emphasis on the idea of a "South American" Antarctica, through which Argentina and Chile covered over their differences to declare that the Peninsula region belonged to them and not to any distant imperial power.[18]

Once again, Britain responded not by surrendering its claims to the Falkland Islands Dependencies, but by redoubling its scientific activity in the region. Operation Tabarin came under civilian control and changed its name to the Falkland Islands Dependencies Survey, known colloquially as FIDS.[19] Funding for FIDS came predominantly from taxation of the Antarctic whaling industry, and there was a real attempt to make the Falkland Islands Dependencies economically self sufficient.[20] Though this scientific institution, the British sought to implement a systematic and well-publicized program of scientific research that would demonstrate to the world why they should be acknowledged as owners of the Antarctic Peninsula.[21] Although there were some problems with the work of FIDS, both organizationally in Britain and logistically in Antarctica, this research successfully maintained Britain's scientific presence in the Falkland Islands Dependencies. At the same time, Britain reminded the world of its long history of polar science and exploration. The 1948 Ealing Studios movie *Scott of Antarctic*, directed by Charles Frend and starring John Mills as Captain Scott, was one such effort to draw upon the legacy of the heroic era at the height of the Antarctic sovereignty dispute.[22]

[16] Smith (2004)
[17] Howkins (2007)
[18] Howkins (2006)
[19] Dodds (2002b)
[20] Elliot (1998)
[21] Fuchs (1982)
[22] Dodds (2002a)

One of the most ardent proponents for politically useful scientific research in the Falkland Islands Dependencies during this period was Sir Miles Clifford, the governor of the Falkland Islands.[23] As a colonial administrator in Africa, Clifford was steeped in the informal doctrine of the British Empire that colonies should pay for themselves. He also understood the notion of an economic quid pro quo, and believed that since the whaling industry was paying for British science in and around the Antarctic Peninsula, they should receive some of the benefits. Clifford's solution was to focus on the science of meteorology, which could provide useful weather forecasts to the whaling fleets at the same time as occupying various more accessible parts of the Antarctic Peninsula region. Despite internal opposition to this meteorological focus from some British scientists, and despite the numerous problems associated with weather forecasting in such a remote location, by the early 1950s, the Falkland Islands Dependencies had a functioning network of meteorological observatories.

Another example of Britain's use of disinterested science to promote their political agenda can be found in their participation in the Norwegian, British, Swedish Expedition to Queen Maud Land. The fact that this expedition explored an area outside that claimed by Britain added to the idea that this was a "genuine" scientific project. Under the guidance of Hans Ahlmann, this was certainly one of the most sophisticated scientific expeditions ever to conduct research in Antarctica.[24] But just as the Norwegians and Swedes had clear political motives for participation in this expedition, so too did the British.[25] There was no better way for the British to appear genuinely committed to Antarctic Science than to participate in an expedition outside the territory that they claimed. But such an appearance of "pure science" could not help but strengthen Britain's hand in the Antarctic Peninsula dispute with Argentina and Chile. The Norwegian, British, Swedish, expedition would provide a model for the international scientific co-operation that would follow. But it also offers a reminder that international co-operation around purely scientific research is often far from politically neutral.

The International Geophysical Year

Despite the best efforts of Sir Miles Clifford and others, from the early 1950s Argentina began to pull ahead in the competition to conduct scientific research in Antarctica.[26] President Perón embraced his "Antarctic Dream," famously promising to "saturate" the southern continent with Argentine bases. Hernán Pujato, Perón's right-hand man in polar affairs, instituted an ambitious program of Antarctic activity, which he hoped would culminate in an overland expedition to the South Pole.[27] Argentina had two distinct advantages over their British rivals: geographical proximity and the ability to concentrate money and scientific resources on the Antarctic dispute. Britain's claims to "environmental authority" around the world were becoming increasingly thinly spread as nationalist movements surged throughout the British Empire. On a global scale, both the United States and the Soviet Union overshadowed Britain's assertions of scientific and technological leadership.

[23] Howkins (2008a)
[24] Sorlin (2009)
[25] Lewander (2007)
[26] Howkins (2007)
[27] Rigoz (2002)

Britain's assertions of environmental authority in Antarctica were given a reprieve by two events. Firstly, the overthrow of President Perón by a military coup in September 1955 threw Argentina's Antarctic policy into chaos.[28] Secondly, plans for an International Geophysical Year (IGY) offered the British an ideal stage on which to demonstrate to the world their assertions of environmental authority. British scientists, most notably, Sydney Chapman, had been involved in the planning and organization of this international scientific research program since its genesis at the beginning of the decade.[29] The IGY was to be a worldwide endeavor to measure and understand the earth's geophysical processes. But with echoes of the famous 1895 Geographical Congress resolution, Antarctica was to be a major focus of the IGY, due to the continued scarcity of knowledge about the continent. The enterprise was ideally suited to British and their rhetoric of "pure science," and it offered the country an excellent opportunity to highlight the quality of their Antarctic Scientific Program.

Britain's plans for Antarctic Research as part of the International Geophysical Year (IGY) of 1957-58 can be seen, at least to some extent, as a response to Argentina's initiative.[30] Three programs in particular came to be associated with Britain's contribution to the IGY: the Fuchs-Hilary "Crossing of Antarctica", Peter Mott's aerial survey of the Antarctic Peninsula, and the Royal Society's Halley Base on the Weddell Sea. Of these, only the Royal Society expedition was officially part of the IGY, although some of the scientific activities of the Trans-Antarctic Expedition also had "official" status. Barely hidden political objectives underlay each of these ostensibly scientific activities. Perhaps most blatant was the British Prime Minister's boast that Vivian Fuchs would cross the Antarctic continent never once stepping outside the British Empire, since New Zealand claimed the Ross Sea region that would be the destination of the expedition.[31]

Scientific and political bravado, however, was only one half of the story of Britain's contribution to the IGY. Britain's active response to Perón's "Antarctic Dream" had already raised the economic costs of retaining British sovereignty in Antarctica. Crucially, from the late 1940s, British activity in the Falkland Islands Dependencies had ceased to pay for itself: in addition to revenue gained from the whaling industry, taxpayer money was required to finance the expanded work of FIDS. Certain officials in the British Government, most notably in the Treasury, questioned the rationale for retaining exclusive sovereignty over the Antarctic Peninsula region.[32] In defense of the status quo, Colonial Office officials pointed to the possibility of finding valuable mineral resources in the Falkland Islands Dependencies. It would be rash, they argued, to give up Britain's Antarctic claims without knowing exactly what they were worth.

As a consequence of this Colonial Office reasoning, the British government conceived of the IGY as something of an "economic survey." In the wake of the Suez Crisis of 1956, the British were re-thinking their strategic priorities throughout their colonial empire. The initial results of this re-evaluation were published in a report entitled *Future Constitutional Developments of the Colonies* (1957), more commonly known as part of Prime Minister Harold Macmillan's "Audit

[28] Howkins (2007)
[29] Sullivan (1961)
[30] Howkins (2008b)
[31] Dodds (2005)
[32] Rowe Dutton (7 January 1948)

of Empire." The section on the Falkland Islands Dependencies explicitly stated the importance of the results of the IGY on the decision whether or not to retain sovereignty in the Falkland Islands Dependencies: "Our withdrawal from Antarctica would mean a loss of UK prestige and influence, especially in scientific circles. It might also involve the loss of strategic minerals, but this will be easier to evaluate when the results have been assessed of the work done during the International Geophysical Year. Argentina and/or Chile, which have claims (partly competing) to the Dependencies, would probably step in if the UK withdrew.[33]"

As well as highlighting the centrality of "strategic minerals" to British thinking towards Antarctica, this document is also interesting for its emphasis on scientific prestige. Even as late as 1957, the British continued to associate scientific activity with imperial prestige and influence.

There was no single point either before, during, or after the IGY when scientists declared that there was little of immediate economic value to be found in Antarctica. Instead, there was a dawning realization among both scientists and politicians that Antarctica was not the frozen *El Dorado* of popular imagination. The ice was too thick, the climate too hostile, and, most importantly, no major valuable mineral deposits were found. Combined with the rapid decline of the Antarctic whaling industry, this growing awareness of the "reality" of the Antarctic environment served to undermine any case for retention of exclusive sovereignty based on economic potential.[34] In fact, from a political perspective, the failure to find valuable minerals would turn out to be the most important scientific result of the IGY.

Britain's response to the diminishing economic potential of Antarctica differed from that of Argentina and Chile. The claims of the two South American nations had become somewhat detached from the material reality of the continent: the Antarctic Peninsula region, they argued, belonged to Argentina or Chile simply because it was an "integral part" of their respective national territories. In Britain, however, there was an economic bottom line: if any part of the empire could not pay for itself, then its feasibility would be questioned. The re-evaluation of Britain's claim to the Falkland Islands Dependencies did not come solely as a result of the IGY: much broader changes were taking place in the British Empire that would lead to the accelerated decolonization of much of the colonial empire.[35] But the results of the IGY undoubtedly had an influence. British politicians and officials reassessed the worth of maintaining exclusive political sovereignty in the Falkland Islands Dependencies, especially given the economic and diplomatic costs of the on-going dispute with Argentina and Chile. They did not, however, want to abandon their political influence entirely. Some form of limited internationalization, they reasoned, offered the best means of diffusing political tensions in Antarctica while retaining political influence in the region.

Scientific Internationalism

Having decided that some form of limited internationalization would be the best option for British interests in Antarctica, British officials set about making this happen. In this process they worked closely with the United States, Australia, and New Zealand. The rhetoric of scientific

[33] Cabinet Office (May 1957).
[34] Elliot (1998).
[35] Darwin (1988).

internationalism provided one of the principal tools for achieving Britain's political goals. Science in general, and the goodwill generated by the IGY in particular, offered a non-threatening way to bring political rivals together to discuss political questions. This use of science to support limited internationalization rather than exclusive science ostensibly represented an 180º turn in British policy. But the focus of British policy continued to be the retention of political influence in Antarctica; however this could best be achieved. The use of scientific rhetoric to bring about the internationalization of Antarctica demonstrates the malleability of the relationship between science and politics, as well as the pragmatism of British officials.

Despite its obvious competitive features (such as the competition between the United States and the Soviet Union to locate a base at the South Pole), the cooperative elements of the IGY offered the negotiators an ideal foundation for partially internationalizing the Antarctic continent. During this eighteen-month enterprise, the twelve nations participating in Antarctic research worked together to further scientific understanding of the southern continent. The centralization of meteorological data at Weather Central, where it was processed by an international team of meteorologists, was one example of such cooperation.[36] Another example was the exchange of scientific personal, which took place despite political rivalries. Perhaps most importantly, the IGY offered a model for the temporary suspension of sovereignty claims that would shortly be incorporated into the Antarctic Treaty.[37]

A series of secret meetings between Britain, the United States, Australia and New Zealand in the second half of 1957 and into 1958 set in motion the process that would lead to the signature of the Antarctic Treaty of 1959.[38] The British government was not the only government that had come to favor an international solution to the Antarctic problem, but it was among the keenest and most pro-active. During the early quadripartite negotiations, British officials took a notably realist position, for example arguing against the United States that the Soviet Union should be included in the Antarctic conference. In May 1958, the United States issued an invitation to the other eleven nations that had participated in IGY research to a meeting in Washington in order to discuss the political future of Antarctica. The explicit connection between science and sovereignty offered a neat justification for the exclusion of potential "troublemakers," including both Soviet satellites and the newly independent states of the "Third World" bristling with anti-imperialism.[39]

After months of preliminary negotiations, the Washington conference of October-December 1959 led to the signature of the Antarctic Treaty. Article IV of this treaty, suspended all existing sovereignty claims, neither recognizing them nor rejecting them. In many ways this was exactly what Britain had come to want: the signature of the Treaty diffused political tensions, while British claims remained in a state of suspended animation, to be brought out again if ever the occasion should demand. The Antarctic Treaty can be seen as a treaty of decolonization: its

[36] Belanger (2006)
[37] Article II of the Antarctic Treaty referred directly to the IGY: "Freedom of scientific investigation in Antarctica and cooperation toward that end, as applied during the International Geophysical Year, shall continue, subject to the provisions of the present Treaty."
[38] See, for example, British Embassy in Washington (14 January 1958)
[39] British Embassy in Washington (14 January 1958)

signatories voluntarily suspended their rights to the normal attributes of sovereignty. But it was a treaty of decolonization that preserved imperial interests, since sovereignty claims remained in a state of suspended animation.

Not only did science provide a rhetorical device to bring countries together to sign the Antarctic Treaty, but it also provided the British, and other signatories, with a means of retaining their political influence into the Antarctic Treaty System. By the terms of the Antarctic Treaty, only those countries with "substantial scientific interest" in Antarctica – usually meaning the ownership or maintenance of a scientific station – would have a place at the political negotiating table. This offered a convenient way of keeping potential "trouble makers" on the outside the politics of Antarctica. For the first twenty years of the Antarctic Treaty System, the Scientific Committee for Antarctic Research (SCAR), with its headquarters in Cambridge, England, enjoyed an inordinate influence on Antarctic policy making. The British Empire also benefited from the location of the Glaciology World Data Center in Cambridge, and the relocation of the Antarctic Weather Center to Melbourne.[40]

Scientific research continues to dominate the politics of Antarctica up to the present, possibly enjoying a greater hegemony today than at any time in the continent's history. Although the full membership of the Antarctic Treaty System has more than doubled from its original twelve members, it remains a system of ins and outs. Disinterested science continues to bring political advantages to those countries that can afford it. In the 1980s, for example, the British Prime Minister Margaret Thatcher, used the "discovery" of a hole in the ozone layer over Antarctica by a team of British scientists, as a justification for Britain's ongoing presence in the South Atlantic: "In the aftermath of the Falklands conflict we were able to strengthen Britain's presence in the South Atlantic by increasing our scientific effort. This paid off remarkably quickly in a totally unexpected way with the discovery by the British Antarctic Survey of the ozone "hole" over Antarctica in the austral spring. This brought home to the whole world the potentially dangerous changes in the environment which mankind's activities are bringing about and led to the first measures to control pollution on a global scale."[41] Less than three years after the bitter war between Britain and Argentina over the sovereignty of the Falkland Islands/*Islas Malvinas*, British Antarctic science "for the good of humanity" was again being used for distinctly political purposes.

Conclusions

The performance of Antarctic science played a central role on all sides of the Antarctic sovereignty dispute between Britain, Argentina, and Chile. The British believed that for science to serve a useful political purpose, it had to appear to be politically neutral. At least until the IGY of 1957-58, British officials used science to give a veneer of disinterested altruism to Britain's claims to Antarctica. There was an element of Kipling's "white man's burden" to British Antarctic policy: Britain made its claims, British officials argued, not for imperial prestige, but for the good of humanity. Ultimately, both politicians and scientists benefited from this relationship. Through the Discovery Investigations, Operation Tabarin, and the Falkland Islands Dependencies Survey, British scientists received support and funding that they almost certainly

[40] For details of the politics of Antarctica after the signature of the Antarctic Treaty, see Beck (1986).
[41] Margaret Thatcher, writing in the Foreward to Fogg (1992:xv).

would not have received without the impetus of the sovereignty dispute. As a consequence, scientific understanding of Antarctica developed substantially over the twenty-year period of the active dispute.

Towards the end of the 1950s, the results of Antarctic science began decisively to influence British Antarctic policy making. In particular, the research associated with the IGY of 1957-58 revealed that there were no economically valuable mineral resources in Antarctica, at least in the short-to-medium term. On the contrary, IGY research confirmed a continent with difficult accessibility, deep ice and a hostile climate. Since the British went into the IGY treating it as something of an economic survey, this realization shaped their political attitudes to the continent. With the growing awareness that the Falkland Islands Dependencies could not pay for themselves, British policy makers came to favor the partial internationalization of the continent. This shift in British attitudes helped to lay the foundations for the Antarctic Treaty of 1959, which the British made sure would preserve, rather than end, their political influence in the continent.

In pushing for the 1959 Antarctic Treaty, the British continued to exploit the idea of environmental authority. But rather than using scientific prestige to support their claim to exclusive sovereignty, they now used it to support calls for a limited internationalization of the continent, on their terms. The Antarctic Treaty, the British argued, would be the best framework for continued scientific research in the southern continent. In this way, the British effectively transferred the concept of environmental authority to the Antarctic Treaty System, a system in which they would play a leading role. Just as the British Empire had used "politically neutral" science to serve their political interests, the Antarctic Treaty System continues to use politically neutral science to serve its members' political interests.

This study of British Antarctic Science from 1939-1959 reveals the complexity of the relationship between imperial power, scientific research, and the Antarctic environment. The performance of science was clearly used as a rhetorical strategy by all three countries involved in the dispute over the Antarctic Peninsula, in order to support their competing agendas. The British, lacking the advantage of proximity, consistently stressed the quality of their research as a justification for sovereignty. This scientific rhetoric was highly malleable, and could be used to support internationalization when the political circumstances demanded. But Antarctic science was never just rhetoric. Even though science was politically motivated, it generated results that added to understanding of the Antarctic environment. These scientific results in turn had political implications, often leading to new rhetorical uses for science. This study clearly reveals that there is no clear line between actual scientific work and the rhetorical use of science.

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SOME ASPECTS IN THE HISTORY OF ICE CORE DRILLING AND SCIENCE FROM IGY TO EPICA

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Abstract

Ice core drilling technology has made important new advances in Europe during the past few decades, which has now placed Europe among the leaders in this field of polar research. Less well known is how ice core drilling and its technology has its roots in the Cold War of the 1950's into the 60's, and particularly, with a covert US agreement with Denmark over the placement of nuclear weapons on Greenland. Later geopolitical and scientific disagreements also influenced developments. The vision of an all-European ice-core drilling venture in Antarctica, for example, matured in Greenland during difficulties that cropped up in US-European collaboration with Denmark and Switzerland in the mid-1980's. Historically it coincided with the Reagan administration's Strategic Defense Initiative (SDI), popularly called Star Wars, a weapons-related Research & Development program that introduced a certain amount of suspiciousness and hostility vis a vis scientists in other countries. Although this did not seem to have affected support from the Division of Polar Programs (DPP, the funding agency of the US National Science Foundation, in Washington, D.C.), other factors like different concepts of ice core drilling techniques and strategies, as well as incongruence between rules for funding research at US and European universities, respectively, combined to rupture US-European collaboration in ice core drilling in Greenland. The transatlantic disagreement in turn precipitated formation of a successful all-European consortium in Greenland that fortuitously became the incubator for EPICA, the European Program for Ice Core Drilling in Antarctica that started in 1995.

Introduction

The vision of an all-European effort can be traced back to the Greenland Ice Core Project (GRIP) in 1992, which evolved after the original US-Danish-Swiss Greenland Ice Sheet Program (GISP) was completed in 1981; and even before that, in an attempt in the early 1970s to launch a European Antarctic Project (EAP), one that never made it. The difficulties in the Greenland research planning in the mid-1980's were turned around and became new opportunities for the Europeans, scientifically, technologically and geopolitically. This paper focuses on the Cold War phases as well as the converging and diverging international co-development of ice core drilling. It traces a long line of research that goes back to the International Geophysical Year (IGY) activities by SIPRE and CRREL (see below) starting at Site 2, NW Greenland in 1956-1957; and Byrd station, and the Ross Ice Shelf Antarctica, during 1957-1959, and climax with the successful bed-rock drillings that were accomplished in northern Greenland at the US military research station Camp Century in 1966, and Byrd station, Antarctica in 1968. It was both at Site 2 and Camp Century and Byrd Station that the first intermediate depth and bedrock depth ice cores were retrieved, thanks to the foresight of US scientists and engineers who were able to devise basic research efforts that successfully "piggy-backed" on the ongoing US military operations. This paper also analyses how this early work inspired later polar ice core research,

and the interpretation of data, which has had an important bearing on understanding the climate change phenomena that now, some forty years later, so definitely dominates the present scientific scene. In addition a number of conclusions are drawn concerning the character of institutional arrangements and policy measures that were needed in Europe to facilitate a big project like EPICA. This paper thus addresses the question some of necessary conditions for large-scale institutionalization of Antarctic collaborative research, factors like the scientific prowess of scientific communities in particular nations, technological resources, economics but also diplomacy and (micro- and macro-) politics.

In 1996 a European consortium of ten countries, the European Project for Ice Coring in Antarctica (EPICA) went into operation, leading within a decade to the recovery of very deep ice cores at two main sites. These are the French-Italian Concordia station and the German Kohnen station situated at the Dome C area and on Dronning Maud Land, respectively, two points far away from each other on the East Antarctic ice sheet. Project results are many and they have had a direct bearing on current discussions concerning global climate change.

A distinction must be made between, first of all, ice core science and interpretation, secondly drilling technology needed to recover ice cores, and thirdly the publication of scientific results. The latter form the basis for periodic assessments made by the Intergovernmental Panel for Climate Change (IPCC) in its efforts within the UN framework to provide national governments with scientific evidence for policy. An important factor in this context is that reconstructions of climate in polar regions from water isotopes in ice from either deuterium or oxygen O^{18} gases concentrations have become successively more sophisticated as researchers build on the earlier discovery of a link between greenhouse gases and climate in the past, and the characterization of rapid climate changes.[1]

Parallel to ice core science and interpretation, on the side of the tools needed, drilling technology has made important advances and the Europeans are among the current leaders in this research. The present European prowess in the field owes much to the experience gained by the Danes and Swiss in the course of collaboration with US scientists and drilling experts in the 1960's and 1970's. In this paper attention is on this transatlantic collaboration as a background to the emergence of EPICA. It is noted how the vision of an all-European ice-core drilling venture in Antarctica matured in Greenland during differences of opinion that cropped up between

[1] Hans Oeschger in Bern Switzerland who early on did radiocarbon dating of ice was the first to identify this link; he and his team were pioneers in unraveling the greenhouse gas/climate relationship and measure the glacial-interglacial change of atmospheric CO2 (Oeschger et al. 1968, Oeschger et al. 1982, 1985, Oeschger et al. 1984, Neftel et al. 1982, Stauffer & Oeschger 1985, Dansgaard & Oeschger 1989). Dansgaard et al. (1969, 1970, and 1971) constitute the first definitive publications on paleoclimates and deep ice cores. See also Oeschger and Sigentaler (1988) and Stocker (1999). Later a more general treatment was forthcoming from Claude Lorius and Jean Jouzel in France - cf. Jean Jouzel and Claude Lorius, "Paleoclimate from ice cores", http://www.brgm.fr/dcnewsFile?ID=269 accessed 16/1/08. For a broader historical overview of "the discovery of global warming", including the roles particularly of meteorologists and oceanographers, as well as climate-change simulation models, see Spencer Weart (2003). Weart, who is the Director of the Center for History of Physics of the American Institute of Physics, has also made his text available in digital form at <http://www.aip.org/history/climate/>.

European and US partners in the mid-1980's. The transatlantic tensions that emerged after the completion of the joint Greenland Ice Sheet Project (GISP) in turn precipitated formation of a successful all-European consortium in Greenland (Greenland Ice Core Project GRIP - see below) that fortuitously became an incubator for EPICA. Difficulties were turned around and became new opportunities, scientifically and technologically. In what follows some aspects of this history are traced.

Snow and Ice Studies Driven by the Cold War

Just as the Korea crisis was expanding in 1951 the US established the Thule Airforce Base on northern Greenland. It was placed about 1100 km above the Arctic Circle on a meridian midway between New York and Moscow as an operations base and refueling point for long-range bombers potentially directed at the Soviet Union. In this connection the US Army Corps of Engineer's Snow, Ice and Permafrost Research Establishment (SIPRE), which was formed in 1949, started a series of snow and ice studies on the Greenland ice sheet. When a decision was taken 1955 to construct a Distant Early Warning (DEW) line of polar region radar stations stretching from western Alaska, over northern Canada and Greenland to Iceland, glaciological research increased in the US to more fully understand the nature and environmental conditions existing in the polar latitudes, for potential future operational requirements. The main engineering research done by SIPRE in Greenland was in studies of structures above, on and under the permafrost and snow ice/surfaces, trafficability and transport problems in cold regions, living conditions, survival difficulties, communications etc.

SIPRE's Chief Scientist, Henri Bader had a personal long-term interest in basic ice physics and core drilling, as well as the acquisition of ancient snowfall records, and their relationship to the climate of the past. He was able to persuade the military to tack on ice core drilling research, with the understanding that the research would be partly funded and supported by the National Science Foundation (NSF). The NSF for its part realized that SIPRE (renamed CRREL in 1961)[2] was the only research organization in the US at that time capable of combining the broad experience (Bader) and organization as well as operational ability (piggy-backing into the field, free room and board and much other logistical support from the Corps of Engineers) to conduct a deep ice coring project, thus boosting one of the NSF's many contributions to the IGY.[3]

The DEW line was completed when the International Physical Year (IGY) was just into its second month. The Greenland section of the DEW line included four radar stations in Greenland, Dye 1, Dye 2, Dye 3 and Dye 4 (see map in the Appendix below). Later Dye 3 became an important site of deep ice-core drilling for scientific reasons articulated during pioneering work already undertaken at Camp Century by CRREL. Located some 120 km east of the Thule

[2] CRREL = Cold Regions Research and Engineering Laboratory

[3] Henri Bader was a US citizen born in Switzerland. Under his leadership SIPRE initiated ice trials and core drilling under the auspices of the IGY, in 1956 (305 m) and 1957 (411 m) cores in northwestern Greenland – Bader (1958), p. 177. This was followed by IGY drillings in Antarctica at Byrd station 1957/58 (309 m) and on the Ross Ice Shelf by Little America V 1958/59 (258 m, reaching sea water). In the Antarctic it was the US Navy that provided logistical support. See Langway (2008), p. 2-3 and 15.

airbase, this military research station was set up (just as the IGY was ending) as an experimental facility for possible defense against an attack by a hostile opponent. The US Army required knowledge about building and operating in the harsh climate, which required fundamental information on the properties of snow and firn (compressed snow) for military purposes. The Century camp comprised a little subsurface village built into the ice sheet. It had 32 buildings including laboratories; all dug into the firn, driven on a year round basis from 1960 until 1966. In the polar summer the population was about 200 men, including a contingent of scientists and technicians. Heat and power came from a nuclear reactor (1.5 MW) also located in a subsurface chamber in the firn.[4]

In 1957 a covert agreement was struck between the Danish government and Washington to possibly allow nuclear weapons to be installed in Greenland.[5] Within this framework the US military came up with a top-secret project called *Iceworm*, a plan to create a network of tunnels 10 meters below the surface in the Greenland icecap to hide 600 middle-distance rockets with nuclear warheads on a line from Narsarsuag in the south to Thule in the north.[6] Envisioned was a maze of subsurface tunnels covering about 4000 km with railway-type tracks to move missiles around, invisible to spying eyes in the skies.

Pilot core drilling trials were made in 1956 at Site 2 which was an early inland site near the Thule base (see map in Appendix), with a recovery of an ice core to 305 m; in the following year a second core was recovered reaching to a depth of 411 m (Langway 1958). In 1960 at Camp Century (Greenland) a special chamber housed a deep ice core thermal rig designed by Lyle B. Hansen and built at the SIPRE and CRREL laboratories in the US. Later an electromechanical drill was modified and developed to core drill deeper. In glaciological circles this drill later became famous because of its success in 1966 in recovering the world's first really deep ice core, one measuring 1390 m long. Chester Langway Jr. participated in and was responsible for developing the SIPRE/CRREL field and laboratory ice core program from late 1956 to 1975;[7] later he occupied the same responsibilities at the University at Buffalo, New York state, from 1975 to 1994. His tasks included scientific redistribution of ice core samples for the NSF to external investigators.[8] The logistics and field support for Site 2 and Camp Century was provided by the US Army Corps of Engineers; later support fro GISP was arranged mainly by the Polar Ice Coring Office (PICO) that was managed by James Zumberge and Robert Rutford from the University of Nebraska-Lincoln, where Zumberge was serving as university president.[9]

[4] It was removed in 1964, replaced by diesel generators.
[5] Dansk Uderigespolitisk Institut (1997), pp. 319 ff. Lolck (2004), pp. 92 ff. & Lolck (2006), pp. 37 ff.
[6] Dansgaard (2000), pp. 135-136; Dansgaard (2004), pp. 52-53; Lolck (2004), pp. 91-94, and Lolck (2006).
[7] Along the way he earned his PhD, with a dissertation, *Stratigraphic Analysis of a Deep Ice Core from Greenland* (Langway 1967).
[8] Until 1992 Langway was on contract with CRREL and authorized by the NSF he was the chief custodian for all deep ice cores recovered by the U.S. deep ice core drilling program - Langway (2006).
[9] Splettstoesser 1976; Langway (personal communication 18 Feb 2008) also recalls that in the early days PICO had no expertise in drilling technology. Hansen retired from CRREL and went to work for PICO half way through the GISP research program, around 1974-1975 and continued drill work he originated at CRREL. With GISP, the PICO team only handled the logistics, after GISP (about 1982, with the Filchner-Ronne Iceshelf Project – FRISP - in Antarctica) they began to work on ice sheet core drilling and logistics.

Afterwards early ice core analysts like Langway, Oeschger, Dansgaard and many others were kept busy for many years.[10] In a recent richly illustrated historical overview of early ice core drillings from the IGY onward to GISP,[11] Langway delineates the scientific importance of US work in intermediate depth ice core drilling during the IGY that opened up entirely new prospects for glaciologists. The Camp Century drilling is shown to represent a continuation of a scientific line of investigation from IGY onward through the international GISP research program from 1971-1981.

Walter Wager the first journalist ever to visit Camp Century (on assignment for the *Saturday Evening Post*) in his detailed book of 1962, *Camp Century. City under the Ice*, hints at discussions relating to the *Iceworm* project but dismisses them as unrealistic. The book contains a map of the "city under the ice" showing the location of the drill tower but is silent on the deep drilling experiment going on underneath the snow cover.[12] When Dansgaard first visited Camp Century in 1964 he was not invited to see the drill setup. A few years ago in an autobiographic account of his experiences and Danish contributions to the exploration of the Greenland ice cap Dansgaard remarked: "It is likely that Camp Century was meant as a test experiment for *Iceworm*. The nuclear reactor, the railway, and the heavy Swings, as well as the broad scientific studies of the properties of snow, firn and ice all involved problems that had to be solved before *Iceworm* could be realized."[13] As it turned out the project had to be abandoned as not suitable for the intended purposes. Tunnels in the firn were soon found to collapse and piping and iron rails twisted. The pressure of accumulating snow loads over Camp Century itself caused the ceilings and walls of rooms of the subsurface research station to deform and finally crash. By 1969 what was left of Camp Century was largely inaccessible, hidden under a vast mound of snow. Only the old bore hole, found again seventeen years later, remained scientifically interesting since it afforded an opportunity to measure ice movements at various depths.[14] However it was not until 1997, when the Institute of Danish Foreign Policy published an 1100 page historical report in which the secret of the original military plan and the broader perspective (the *Iceworm* scheme) that was part of the scene of the first deep ice core drilling site were officially affirmed.[15]

[10] See Langway (2008) and Oeschger and Langway (1989). Dansgaard and his team in Copenhagen used their mass spectography laboratory to measure oxygen isotope ratios on thousands of samples from the Camp Century core and after that more on the Byrd station core.

[11] Langway's (2008) overview reviews ice core drillings during the IGY at Site 2, Greenland and in Antarctica, 1956-1959; and Camp Century, Greenland, and Byrd Station, Antarctica, in 1960-1968, over to GISP, in Greenland 1971-1978.

[12] Wager (1962), see especially the third photograph after p. 22.

[13] Dansgaard (2004), p. 52. "Swings" are long trains of big wagons and sledges linked together and pulled by enormous tractors; they were used to transport equipment, fuel, building material and people slowly across the ice sheet from Thule. Later they were replaced by the large Hercules C-130 aircraft as the nucleus of logistics in both Arctic and Antarctic.

[14] In 1986, 1988 and again in 1992 the old drilling site, by then deep under the snow, was revisited. In the latter year the temperature and geometry of the old bore hole was measured down to 30 m above the bedrock (Dansgaard 2004: 60-63).

[15] Dansk Uderigespolitisk Institut (1997), pp. 319 ff.; Lolck, 2004: 92 ff. & Lolck (2006), pp. 73 ff.

Although opinions differ regarding the role of the Cold War as a context,[16] everyone concerned agrees that the Camp Century effort had a significant impact on international glaciology.[17] CRREL pioneered important developments in ice core drilling technology. Equally important was the cooperation that developed with European scientists, around the mid-1960s onward, particularly with teams at the universities of Copenhagen and Bern. CRREL continued SIPRE's custom of seeking available and experienced theoretical and laboratory oriented foreign scientists preferentially with background in snow and ice research who could make contributions to the study and analysis of the paleo-environmental records in ice core research.[18] An early example was Valter Schytt the Swedish glaciologist at Stockholm University who had drilled and interpreted a 100 meter deep core already in 1950/51 during the Norwegian-British-Swedish Expedition to Maudheim, Antarctica.[19] Schytt spent some field time on contract with SIPRE studying the sloping edge of the ice sheet near Thule.[20] Another, of course, was Willi Dansgaard who in 1960 together with colleagues published a paper that drew international attention; it appeared in *Nature* on the topic of oxygen isotopes.[21]

Dansgaard had developed an expertise in isotope-meteorology, separating heavy water molecule components from more commonly occurring lighter ones in water samples and by extension from icebergs calved from glaciers in Greenland. It is a technique applicable to ice cores in order to determine changes in $^{2}H\ O^{18}$ concentrations as a proxy for past changes of temperature far into the past. Dansgaard's interest in extending his analytical technique to ancient ice, and thus the ice sheet, was an idea that provided a platform for cooperation. In his recent historical account Chester Langway observes how "Dansgaard's laboratory, coupled with the technical ingenuity of Sigfús Johnsen and Niels Gundestrup, was capable of automatically measuring 250 melted ice core samples for O^{18}/O^{16} ratios – a remarkable feat then and now."[22] Hans Oeschger of the Physics Department of the University of Bern in Switzerland had already in 1962 become a

[16] Langway (personal communication 18 Feb 2008) explains that the deep ice drilling had nothing to do with the *Iceworm* project and that Dansgaard's "limitations" had nothing to do with secrecy. Camp Century's military existence except as a drill site location, was unrelated and had nothing to do with the drilling. Scientists were lucky to work there, with all the established support facilities available to the deep drilling research project.
[17] Langway (2006).
[18] Langway (personal communication 18 Feb. 2008) recalls how Bader (see above) because of his deep interest in basic research and his earlier background in Swiss glacier studies and experience in ice core drilling in Alaska he sought to advance the field in the U.S. Having made an evaluation of the limited knowledge available in the US at that time of the physical, meteorological and environmental conditions in the high north he made a point of recruiting consultants and hiring foreign research (on contract or actually employed) on a world-wide basis. Thus he was able to draw researchers from Argentina, Greece, Germany, England, Switzerland and more later. Langway himself followed the same policy of locating the best US or foreign researchers for laboratory analyses, noting that Dansgaard and Oeschger were two of at least 29 such persons (19 in the US and 9 in Europe/Asia) - cf. Langway (2008), p. 24.
[19] Schytt (1958).
[20] Schytt (1955). Schytt was at the time working out of the Geography Department at Northwestern University, Evanston Illinois. where he was a guest researcher on contract with SIPRE.
[21] Dansgaard et al. (1960).; a much earlier paper (in *Tellus*) on the analysis of stable oxygen isotopes in precipitation and relating their concentrations to cloud temperatures was path-breaking in this line of research and is still cited in the literature – see Dansgaard (1953).; *Tellus* was at the time a fairly new journal edited by Bert Bolin of the Meteorological Institute at Stockholm University.
[22] Langway (2008), p. 25.

primary collaborator in the CRREL ice core program. He ran an internationally recognized low-level carbon dating laboratory that was one of the first to develop techniques for extracting atmospheric gases entrapped in polar ice cores to measure the variability of CO2 concentration levels as a function of depth and age of the ice of the core.

Apart from nascent collaboration another lasting effect of CRREL's activities in Greenland was the development of a unique snow/ice property field-study kit for international use, helping to standardize measurement procedures. Many young scientists, both Americans and Europeans, were drawn into glaciology thanks to a tradition of research training schools and seminars begun by SIPRE before the IGY.[23] Expertise in drilling technology and logistics, as already mentioned, was developed by PICO (see above).

Independent European Interests and Eforts

Europeans also had their own scientific heritage to build upon. Scandinavian but also German and British researchers had worked in Greenland during various expeditions in the early 20th century.[24] The *Expedition Polaires Francaises* to Greenland with ice core recovery and J-C Heuberger's depth-density curves in the mid-50s precipitated a lively discussion regarding interpretation of ice core results.[25] Around the time of the IGY a large European expedition to Greenland was mounted, the *Expédition Glaciologique International au Groenlande (EGIG)*, involving a consortium of five European countries, France, Germany, Switzerland, Austria and Denmark.[26] Started in 1957 - at the initiative of Switzerland - this institutionalized effort ran until 1960 and then continued with several follow up projects thereafter. It was the first large-scale European joint venture in the polar regions. Since it was largely inspired by the polar experiences of French researchers, particularly the explorer Paul-Emile Victor, France assumed a leading role. Denmark participated largely by virtue of its sovereignty over Greenland, which meant that Danish scientists had a statutory right, and therefore the opportunity, for access to collected materials. Thus Dansgaard was able to obtain samples from 10-20 meter deep snow and firn cores augered on a traverse west to east across the middle of Greenland. The data obtained appeared to confirm a global warming tendency from 1920 to 1945.[27] Within the EGIG Dansgaard also became intimately acquainted and with Hans Oerschger's and Bernhard Stauffer's work in Bern on the dating the age of old ice and developing analysis of CO^2 contents over time of air bubbles in the ice.

[23] In August 1956 Bader and others from SIPRE held a pre-IGY "Polar Glaciology Study Course" on the edge of the Greenland ice sheet to acquaint 17 international researchers with the snow-study kits (devised at SIPRE) before their departure for Antarctic research projects the following season; see Langway (2008), p. 8.
[24] J.P. Koch and Alfred Wegener 1912-1913 and Wegener 1929-1930, Ernst Sorge at station Eismitte 1930-1931, and the Oxford University Greenland Expedition 1938; H. W:son Ahlmann's expedition to Nordaustlandet, Svalbard 1931, with snow pit studies, and his next expedition to Spitsbergen together with H.U. Sverdrup to study ice layer formation were also a significant scientific background factor – for an overview see Schytt (1958), pp. 15-16.
[25] Heuberger (1954), and Schytt (1958), pp. 123-125.
[26] Fleischmann (2005), pp. 51-52; Dansgaard (2004), pp. 30-32.
[27] Dansgaard (2004), p. 36.

In the scientific context at hand isotope analysis of the Camp Century core by Dansgaard's group in Copenhagen with the first reconstruction of temperature variations in Greenland back 120,000 years fired the imagination.[28] Results published in a couple of papers made a big stir. First Dansgaard together with Chester Langway Jr., who was responsible for all ice cores recovered by SIPRE and CRREL, presented a preliminary picture at a symposium arranged by CRREL, in Hanover, New Hampshire, in September 1968, the International Symposium on Antarctic Glaciological Exploration (ISAGE). The name of the symposium indicates the other context where new efforts rapidly developed at that time as glaciologists also increased Antarctic endeavors.

In May 1969 the US, USSR, Australia and France joined together in the International Antarctic Glaciological Programme (IAGP, with the UK joining 1972), focusing on East Antarctica, e.g., the Vostok ice dome.[29] In 1970 an ad hoc group led by J.H. Zumberge within SCAR set up the Ross Ice Shelf Project (RISP), and later a Filchner-Ronne Ice Shelf Project (FRISP) was set up, involving Germany, UK, USSR and USA. A further project, Glaciology of the Antarctic Peninsula (GAP) involving the UK, Argentina, Chile and the USA later emerged in 1973 out of a symposium at the Scott Polar Research Institute (SPR) in Cambridge where airborne radio echo sounding and isotope analysis of ice cores were discussed. Throughout there were significant efforts to standardize methods in glaciology, with the IAGP producing comprehensive standardization guidelines endorsed by SCAR in 1972: measurement methods along traverse lines, geophysical measurements, i.e., radar echo surveying, seismic refraction profiles, magnetic profiling, physical and chemical properties of ice, analysis of traces of radioactivity from atomic bomb tests on other parts of the globe, etc. Although SCAR was largely an old-boys network that did not meet all that often, its role in the landscape of international scientific NGOs was authoritative. Its task was, apart from the hybrid scientific one of science advice to the Antarctic Treaty Organization, to "coordinate" Antarctic research by reviewing plans and cheering on initiatives of individual member countries. It served as an important platform for members of various informal and formal networks (like the SCAR glaciology work group)[30] to meet and keep in touch. The impetus behind many glaciological ventures, as already noted, however lay elsewhere.

Before returning to the chronological chain of events in Greenland it is relevant at this point to first consider the motives for a pan-European project in Antarctica that emerged in the early 1970s, and to consider its failure because these are also relevant factors in the vision of EPICA that matured in Greenland about fifteen years later.

Motives for a European Antarctic Project (EAP)

Extensive radio-echoing surveying took place in Antarctica over a period of 12 successive years (1967-1979). First out were researchers at the Scott Polar Research Institute (SPRI), Cambridge,

[28] Dansgaard et al. (1968), pp. 93-94; and Dansgaard et al. (1969).
[29] See further Elzinga (forthcoming) for more detail on SCAR's role and the EAP.
[30] It is interesting to note that Langway was the first Convener of the glaciology group in pre-1968.

who on the basis of genial British technical and scientific expertise, successful diplomacy, NSF funding from Washington and US naval fleet air arm logistical support for airborne glaciology were able to develop an extensive program that eventually came to provide 40% of our knowledge of the Antarctic ice sheet.[31] It was mostly concentrated to the Antarctic Peninsula and aerial sorties from British and American research stations on the continent, but very little to cover the vast expanse of Dronning Maud Land. In the case of the latter area Belgian and Soviet airborne "radioglaciology" surveys did occur, but these were much more limited and technologically less successful. Australian efforts were also afoot but these were similarly limited and did not extend into DML.

The Belgian case is a telling example of the significance of geopolitics and the right alliances, or the lack thereof. During the austral summer season 1969/70 a Belgian research team in Antarctica did some fieldwork in western DML.[32] A commercially available prototype ice-radar instrument had been purchased and mounted on a ski-equipped Otter plane. The equipment had been tested in Norway, and the Belgians piggy-backed on the South African expedition to get carried by ship from Cape Town to DML where the South Africans had their SANAE base not far from a Norwegian summer station. The collaboration with the South Africans permitted the Belgian team (led by Tony van Autenboer) to make maps of ice-sheet thickness and subglacial reliefs in the region, with good results. The next austral summer season the radioglaciological survey was to continue, at least that was the intention. Unfortunately a rough landing in poor visibility caused the strut of one ski of the Otter to pierce the radio equipment and a reservoir of hydraulic oil. The fire that resulted destroyed the plane, including the RES equipment.

In the meantime back in Belgium, due to political opposition to the South African apartheid regime, officials decided to stop further research collaboration with SANAE. Given this situation a new urgency attended a proposal by Belgian scientists upon their return from Antarctica in 1970. The proposal involved the setting up of a glaciologically focused project on the basis of broad European cooperation (involving 8 nations) under the auspices of the Council of Europe (Strasbourg). A series of 16 meetings were held (1970-1975) in various European cities, gathering researchers in order to develop a plan for what was called the "European Antarctic Project" (EAP).[33]

The plan, worked out 1971/72 was detailed and of good scientific quality. Its centerpiece was deep ice core drilling in a spot not so far from the present Dome Fuji where the Japanese are operating today. Envisioned also was a series of traverses with snow pits and shallow drilling into the ice sheet along the routes, as well as airborne radio echo surveying to extend the Belgian results. The entry point was to be near the Soviet Novolazerevskaya station using a ski-equipped Hercules plane. Smaller planes were to provide support to the various parties in the field. The plan was particularly attractive because IGY traverses had hardly touched DML. Two of SCAR's working groups reviewed the plan. Praise was received from the glaciology group and critique came from the geology group (for insufficient geophysical components). SCAR furthermore

[31] Turchetti et al. (forthcoming).
[32] van Autenboer (2001).
[33] See Elzinga (forthcoming).

stated that if an EAP effort did develop, the non AT-nations that might participate should apply to become Consultative Parties to the Antarctic Treaty.[34]

Failure of the EAP and Lessons Learned for the Future

Smaller nations like Belgium, Norway and the Netherlands were interested in the EAP, as was France, but the UK fell away, preferring to put its eggs in an Anglo-American collaborative basket. France on the other hand was interested in expanding research activities in the Antarctic. Heavy investments with a traverse across "its" Terre Adélie territory in 1971/72 and the launching of a new research vessel, the Marion Dufresne to serve the area was probably a motive for Europeanization so as to share the burden of further costs in the future. Tripartite French-Soviet-US collaboration in ice core drilling at Vostok in Antarctica also began in the early 1970s (the Vostok operations continued in a second phase in the 1980's).[35] West Germany (and to some extent Switzerland) in the early 1970's was more interested in pursuing further collaboration along the lines of the EGIG on the Greenland ice sheet, which was geographically much closer, associated with the honorable tradition of Alfred Wegener (who perished in Greenland 1930), and where it was logistically possible to gain from the military presence of the US as well as the Danish connection and the type of expertise represented by Dansgaard and colleagues in Copenhagen.

The cost of obtaining a Hercules plane and equipping it with skis for Antarctic work in any case turned out to be prohibitive. The combination of the steep cost of logistics, the differences in geopolitical agendas amongst European countries, particularly the negativism of the German delegate (who insisted on an expansion of activities on Greenland as an absolute first priority), and a failure to prepare the ground politically meant that the EAP never made it. The fact that the scientists involved did a poor job of anchoring the project at the political level was a useful negative lesson they made up for twenty years later in Brussels on the road to EPICA. The EAP window of opportunity was essentially closed in 1974, and that was the end also of Belgian plans for joint efforts in radio echo sound (RES) surveying over significant areas of DML. The scientific interest was there, the technology was available, but politics closed a chapter on a plan that was not to be realized until the late-90s when Germany took the lead in the DML leg of EPICA. As already indicated, however, EPICA as a vision only gained its wings in the course of prior European experience on Greenland, particularly in the form of a project that came after Danish-Swiss-US collaboration in GISP, a topic to which I now return.

[34] In practice however neither the AT (being outside the United Nations) nor SCAR today have the legal teeth to prevent any country from undertaking scientific research in Antarctica – however peer pressure for the most part does make for compliance.

[35] A considerable part of the logistical support for Vostok came from the US, with the NSF providing abundant US C-130 aircraft for early supply missions. During one flight out of Vostok there was a crash and loss of a C-130 aircraft during the early drilling phase (Langway, personal communication 20 April 2008).

Stepping up American-European Collaboration in Greenland

Soon after Hansen's drill had penetrated to bedrock at Camp Century (1390 m.) in 1966, it was taken to Byrd station in Antarctica.[36] This went back to earlier US identification and establishment of Antarctica as an important polar core drilling location in 1955. At the Byrd station the drill set a new record in 1968, going down to bedrock at 2164 m. (see map in Appendix). But there it got stuck due to freezing of melt-water at the bottom of the drill hole and had to be left there. The cost of constructing a new drill was estimated to be in the order of 2 million US dollars, so that option was not immediately pursued. The recovery of a long core at Byrd Station provided the planned comparisons of obtaining climate records from both hemispheres, furthering a bi-polar perspective on global climate change. However the loss of the heavy-duty drill delayed further progress in deep ice coring for more than a decade.[37] This was most immediately evident in Greenland where plans had been developed for joint ventures in deep drilling involving both US and European teams.

An initial US-Danish-Swiss collaboration was established in Greenland around glaciological research started in the mid-1960s with a coordinated science study of the Camp Century ice core and progressed to planning together the Greenland Ice Sheet Project (GISP). Its purpose was to drill several intermediate depth, and three bedrock very deep ice cores. An airborne radio echo surveying of the ice sheet was conducted to assist in locating optimal drilling sites. Three preliminary 400 m shallow cores, surface geophysical studies, airborne depth soundings and numerous 100 m cores and pit studies were made or conducted and data analyzed during the period 1971-1978. Radar surveys of the topography utilized the remote sensing capability for ice sheet soundings developed at the Danish Technical University (DTU) at Copenhagen by Preben Gudmansen and his team. With a good map of the subsurface topology of the ice sheet in hand the Danes in particular were keen to move onto the highest part of the ice cap somewhere near Summit in the middle of central Greenland. Frustrations developed as further work was contingent on US Air Force support and anxiety at the NSF in Washington regarding costly budgets and some amount of uncertainty regarding the outcome. In the end logistics determinants dominated over scientific criteria. Several new hitches attended efforts to devise new drilling equipment together with the vast costs involved in the logistics of such an operation led the NSF Division of Polar Programs (DPP) to force the consortium to settle on a site of convenience, next door to the American DEW line radar station Dye 3, a six story high 7000 ton steel construction on adjustable stilts that had been completed in 1960.[38] There one had the advantage of ready access with routine flights by US Air Force C-130 supply planes, as well as housing facilities and the use of a mechanical workshop for repairs and servicing of the drill.

Alongside Dansgaard, a person who played a key role in GISP, making the logistics function and seeing to it that analysts got deep ice cores for their science, was Niels Gundestrup of the Oerstedt laboratory at the University of Copenhagen. His dynamic personality, innovative ideas and high visibility helped shape the creative Danish glaciological group, making it an attractive

[36] Gow (1970); Langway (2008), p. 23; Dansgaard (2004), p. 63.
[37] Dansgaard (2004), p. 63.
[38] Dansgaard (2004), p. 64 ff.; the USAF did not abandon Dye 3 until 1990.

partner for financially better endowed institutions in the US, Europe and Japan. He was initially an electronic engineer working in Preben Gudmansen's laboratory on the development of ice radar instruments at DTU, and later in the early 1970s worked on automating the mass spectrometer at the University of Copenhagen. After he was recruited as electronic technician to the glaciology group he built the electronic parts of the Danish Shallow Drill as well as of the ISTUK drill while Sigfús Johnsen elaborated the mechanics. The drill was called ISTUK, a name that combines the Danish word for ice ("IS") with the Greenlandic word for spear, awl or drill ("TUK").[39] It built on experience and ideas gained in connection with the first shallow fast light-weight electromechanical core drill in 1974-1975. When Lyle Hansen's 1977 test at Dye 2 of a new wireline system intended for the GISP deep drilling at Dye 3 partly failed it was Johnsen and Gundestrup that took on the challenge to construct a new deep drill.[40] The Danish electromechanical design was thus extended and a Swiss drill head incorporated. Henri Rufli at the Physics Department of the University of Bern constructed the drill head, cutters and shoes for this new lighter technology that emerged in broad consultation within the network centered in Copenhagen. Johnsen essentially took over Lyle Hansen's role in GISP. Originally from Iceland but now with the Ice and Climate Group in Copenhagen, Johnsen recalls how Gundestrup "was the master behind the electronic parts of the drills besides being our logistic expert."[41]

The ISTUK drill system was tested in the CRREL ice well at Hanover, NH in 1978.[42] For Dansgaard and his colleagues in Copenhagen the exercise proved to be an entirely new field of endeavour since they initially had no hands on experience neither in constructing a deep coring drill nor in the actual drilling operation. However the venture was successful, in the long run giving the Europeans a greater degree of independence. Bedrock core drilling at Dye 3, Greenland, began July 1979 with Niels Gundestrup and especially Sigfús Johnsen as primary drillers.[43] Bottom ice was reached at 2037 m in August 1981. After four seasons bedrock was reached, yielding a core more than 2 km long, providing important new data to compare with the Camp Century core results. An under-the-snow research laboratory was used on site to catalogue the cores and data on physical, mechanical and optical properties. A new electrical conductivity method (ECM) invented by Claus Hammer of the Copenhagen University glaciology group was used to continuously measure micro-particle concentrations and eruptive volcanic-acid horizons, an invaluable method for precise determination of the time scale for the Dye 3 core.[44] Initial results could already be presented less than one year after completion of the drilling.[45] The next plan of the GISP consortium was to proceed to Summit to recover an even longer ice core from an optimum site. However this met many new difficulties that in the end led to a breakdown of formal cooperation and the Europeans and Americans (GRIP was after GISP) each doing their

[39] Dansgaard (2004), p. 84f. (where one can also find pictures); and Lolck (2004), p. 137 ff. (also with pictures).
[40] Sigfús J. Johnsen (personal communication 22 January 2008).
[41] Ibid.
[42] It was this drill that was used to recover the Dye 3 core from 1978 to 1981 as well as the GRIP core from 1990 to 1992.
[43] GISP concept and action plan was presented and reviewed by officials of NSF's DPP already in the fall of 1970. The entire GISP operation thus stretched out over an 11-year field period; see Langway (2008), pp. 27-28.
[44] Langway (2008), p. 32; Dansgaard (2004), pp. 78-82.
[45] At a special GISP science symposium in Philadelphia, June 1982 (Langway et al. 1985).

own thing. Consequently by 1990 there were two rival deep coring projects in the Summit area 28 km apart in central Greenland.

The Culmination of the American-European Joint Effort in Greenland

After GISP views of US and European scientists differed regarding how to continue after its completion. Two opposing concepts of how to organize further deep core drilling on Greenland; this combined with changes in the directorship at the NSF Division of Polar programs in 1983 that seriously complicated matters. At the highest political level the changes coincidentally followed on the heels of Ronald Reagan's victory in the presidential elections. The new Reagan Administration was very concerned about the threat to American interests posed by the Soviet Union. National security thus became a major issue (albeit not for the drilling project). The most dramatic manifestation of this was the Strategic Defense Initiative (SDI), popularly known as Star Wars, introduced in 1983, a mega-scale military project for setting up an anti-missile defense system on platforms orbiting around the Earth. The spending by the fiscal year 1987 was already in the order of 3.5 US billion dollars within an overall anticipated spending of 30 billion dollars 1985-1993 when a decision for deployment had to be in hand.[46] 5% of the Star Wars budget was for "mission oriented basic research" in universities and small business firms. In Europe the SDI program was seen as a covert industrial policy program, prompting Mitterand in France to launch his proposal for a European Eureka program, a civilian IT-oriented program for civil and industrial high tech development than in part covered the same areas of technology and science investments found in SDI. The motivation for the French initiative was SDI itself, which was understood as a threat, creating a potential for a widening technological gap between Europe and the US. Although these developments did not directly affect the drilling project, indirectly however they may have created a political situation in Europe that was more conducive than before when it came to independent action and research funding at a supra-national level even in the field at hand. Within the US itself SDI evoked strong opposition at various universities, and in some cases a bit of mistrust and cynicism. Leading research administrators were coming out saying, "people go where the bucks are".[47]

The experience of leading European researchers is that animosity did not spill over into the glaciological community.[48] As long as Edward Todd was director of the Division of Polar Programs (DPP) and Duwayne Andersson, DDP was Chief Scientist at the NSF in Washington relations with foreign scientists like Willi Dansgaard ran smoothly. However, in late 1984 a new director came in,[49] leading to some reshuffling and sharpened controls. Dansgaard recalls how the "new director of NSF-DPP felt that the U.S.A. had gained too little from Dye 3. He claimed cryptically that 'the scientific community in the States is not ready for a new deep drilling', which had to await 'a series of ramp-up projects with the aim of defining exactly where to drill'. Hans Oeschger expressed concern that 'ramp-up projects' could very well turn out to be 'ramp-down projects', since the present experienced staff might leave for other tasks, if the big one

[46] *Aviation Week and Space Technology*, April 13, 1987.
[47] James Ionson, cited in *Physics and Society*, Vol. 15, No. 2 (April 1986), p. 3.
[48] Bernhard Stauffer, personal communication 25 January 2008.
[49] Peter Wilkniss, director of DPP, 1984-1993.

faded out of sight. I claimed that the radar survey and the shallow intermediate drillings had already defined the best locality, Summit, with sufficient accuracy. Furthermore we had proven that ISTUK could do the job. However, the new DPP director created the myth that the Danes got 'a free ride'. He asked for a review of direct Danish and Swiss financial contributions to GISP for comparison with the Americans, and did not accept 'internal means' being included, which simply revealed lack of knowledge about how things worked abroad."[50] In some circles the rumor emerged that earlier DPP officers allegedly had been passing CRREL money on to pay Danish salaries. They were said to be "laundering money" via NSF to the benefit of foreign researchers.[51] The main question at issue here was not one of foreign policy, nor of animosity between American and European scientists, but rather a combination of two research policy factors. First of all, until the success of the Dye 3 deep drilling Chester Langway was in principle in the US more or less a one-laboratory endeavor working with European partners. As Bernhard Stauffer recalls, the success at Dye 3 made the front page of the *New York Times* and increasing numbers of scientists in the US became jealous and insisted they wanted to participate in a new deep drilling project. Chester Langway dropped out of preparations and the NSF/DPP was faced with orchestrating a much broader and less experienced American constituency of researchers, making it difficult to come to an agreement with the Europeans.

The other problem that complicated the situation was the difference in accounting systems for R&D funding in the U.S. compared to that at most European universities. The system applied at the University of Copenhagen was one where the salaries for professors and lab technicians were absorbed in block grants and did not show in the budget of an ice drilling campaign in Greenland. In the U.S. on the other hand such costs were included in project budgets and there was a more complicated system of overheads. With Peter Wilkniss as new director at DPP the two different systems of R&D resource accounting came into open conflict with each other. Dansgaard was furthermore upset by the fact that in this connection the Danes were not given due credit for all the costs associated with the time used to design and construct the new drill, ISTUK, which finally did the job at Dye 3. Chester Langway's reading of the situation was obviously quite different from Wilkniss' at the DPP.[52] He stated that in his view the Danes had certainly pulled their weight, not only in terms of costs but also by virtue of their superior scientific contributions in GISP. In an interview in 1992 he clarified how by 1981 two contrary conceptions of future work had emerged. "/The program was getting too big /and with/ so many people in the United States getting interested in ice cores…there was a necessity of getting more samples. The Europeans (and I agreed with them) were willing to go forward and drill where they are drilling now…. And interact with any American who had something to contribute, but not as a kind of training program….The Europeans didn't need the support of the U.S. in terms

[50] Dansgaard (2004), pp. 96-97.
[51] Anthony Gow in an interview with Brian Shoemaker 26 October 02, p. 80 of the transcript: "TG: Well they were laundering money from NSF actually, which is what actually happened, which is actually illegal. You can't fund salaries to foreign researchers and this is what NSF was doing. BS: Is that right? Was this the Office /sic/ of Polar Programs? TG: Yeah, this was under Todd….the original GISP. They took money from CRREL budgets and gave it to the Danes and they were paying goddam salaries on it."
<https://kb.osu.edu/dspace/bitstream/1811/6520/1/Gow,AnthonyTranscript.pdf> Accessed 15/11/07.
[52] Compare, for example, Langway (2008), p. 25.

of science….There weren't that many [American] people [to extract and study ice cores] at that time."[53]

The Europeans wanted a slim and focused project up at Summit to rapidly obtain new results for comparative analysis of deep cores. The NSF on the other hand was under pressure to take into account a wide range of disciplinary interests and university researchers that wanted to obtain ice samples as well as use a new Greenland site as a training ground for young researchers. This meant a broad "democratic" program that would allow many more U.S. universities to get a piece of the future action. In all about 90 institutions were waiting in the wings hoping to participate (some15 projects were later funded under GISP2).[54] Such a scenario called for a much heavier drill that would recover ice cores that were larger in diameter than those obtained by the Danish ISTUK, and it meant the decision process would take much longer. At DPP the presumption seems to have been that the Europeans would come around since they were in American hands after all when it came to logistic support. By the mid-80s however some senior researchers in the U.S. began to react, criticizing the DPP's chauvinistic approach and the fact that the NSF and Wilkniss were dragging their feet.[55]

New European Initiatives

The third surface-to-bedrock ice core drilled on Greenland was the intermediate depth (324m) Renland peninsula core in 1988, the result of a joint Danish-Icelandic-Swedish effort. The ice core was transported to Copenhagen where laboratory analyses were done.[56] The background

[53] Chester Langway, in interview on 29 October 1992: <http://www.aip.org/history/sloan/icedrill/euro-amer.htm#a4> Accessed 12/1/08.

[54] The Greenland Ice Sheet Project Two (GISP2) was carried out by scientists from: the U. S. Army Cold Regions Research and Engineering Laboratory in Hanover, NH, Carnegie Mellon University the Desert Research Institute in Reno, Nevada, The Massachusetts Institute of Technology, Ohio State University, Pennsylvania State University, the New York State Department of Health, the State University of New York at Albany, the State University of New York at Buffalo, Lamont-Doherty Geological Observatory of Columbia University, University of Arizona, University of Colorado, University of Miami, University of New Hampshire, University of Rhode Island, University of Washington, the U. S. Geological Survey in Tacoma, Washington, and the University of Wisconsin; GISP2 was funded by the United States National Science Foundation Division of Polar Programs as a part of the Arctic System Science Initiative
(ARCSS). The University of New Hampshire coordinated GISP2 scientific activities. Logistical and drilling support was provided by the Polar Ice Coring Office (PICO) at the University of Alaska in Fairbanks. The 109th TAG Air National Guard, Schenectady, NY, and the U. S. Air Force Military Airlift Command from McGuire Air Force Base in New Jersey provide air transport. Support at Sondrestrom Air Base in Greenland is provide by the U.S. Air Force Space Command.

[55] Dansgaard (2000, p. 215) has argued that, "in American circles also there was dissatisfaction with Peter Wilkniss – some called him a catastrophe for American glaciology – but for one or another reason the Reagan Administration had honored him with an award for 'excellent management' (!), so he was difficult to topple from the throne (that happened only seven years later when he was kicked upwards /in the science-bureaucracy/)". This perhaps speculative interpretation is challenged by some of the American researchers who were involved at the time (Chester Langway) and more archival studies in Washington are needed to grasp the context and detail of the situation 1983/84, a task that is one of the focal points of Maiken Lolck's further historiographical studies at the University of Aarhus in Denmark.

[56] Johnsen et al. (1992), Hansson (1994).

was as follows: after Dye 3 Danish and Icelandic researchers began, in 1985, a search for a shallow drill site where they might deploy the small fast flexible drill that had been developed halfway on the road to ISTUK.[57] The idea was to launch a small-scale technical operation so that long-term paleo-climatic information might be gained at a modest cost, utilizing small ski-equipped airplanes or helicopters. The site selected was a small isolated ice cap, only a few hundred meters thick on a high elevation plateau in Scoresbysund Fjord, East Greenland. After a couple of pre-site surveys (1985 and 1987) a small field party plus supplies were deposited on the Constable Pynt airstrip in 1988 by a chartered Royal Swedish Air Force C-130 Hercules aircraft. Thereafter a Greenlander Twin Otter took over to fly the party and equipment to a site near the summit of the Renland ice cap. Swedish radar echo equipment was used to map the bedrock topography. In about three weeks the whole surface-to-bedrock drilling operation was finished and everything was flown out again. The depth was more than twice the greatest depth previously reached by a shallow core drill. Despite its shortness (324 m) compared to deep cores, this ice core covers a full glacial cycle from Holocene into the previous Eem interglacial, giving a good $\delta^{18}O$ profile and a record of aerosol composition that can be interpreted back to 120,000 years BP, adding important new information to the discussion of past climate change and the Greenland coastal environment, a valuable complement to data later obtained in central Greenland. Among other it provided the first Northern Hemisphere record of methane-sulfanate and non-sea salt sulfate over a full glacial cycle.[58] Further payoff from this joint Nordic effort was the reinforcement of Sweden's revitalization in the early 1980s of its involvement in polar research. With the Renland operation Swedish researchers were drawn more tightly into an expanding European network, laying the groundwork for later participation in GRIP and EPICA.[59]

Dansgaard and Oeschger in the meantime were also looking around for new partners in continental Europe. Oeschger had good contacts with Claude Lorius and his glaciological laboratory in Grenoble (France). Lorius expressed considerable interest and was important for the implementation of a new project in Greenland. Important too was the decision of Germany to become more active, with scientists at the Alfred Wegener Institute (AWI) gearing up to carry out the kind of analysis of physical and chemical properties of ice cores that researchers under Chester Langway conducted at the SUNY-Buffalo during GISP.[60] Oeschger and Langway convened an international symposium in Dahlem, West Berlin (March 1988, sponsored by the city of Berlin). It was important for reviewing the then current state of the art regarding ice coring for paleoclimatology. The symposium brought together contributions on the way glaciers record environmental processes, and how to preserve such information, secondly, on how an ice core chronology can be established, thirdly, what anthropogenic impacts are recorded in glaciers

[57] Johnsen et al. (1980).
[58] Hansson and Saltzman (1993).
[59] For example Margareta Hansson (Stockholm University) who has been centrally involved in EPICA (both at Dome C and DML sites), participated in the field and developed her early expertise in laboratory analysis on the Renland core at the Geophysics Department of Copenhagen University and later utilized GRIP results in comparative studies and interpretation of material from several deep cores. Swedish revitalization of its polar research began in the Arctic with the Ymer-expedition led by Valter Schytt in 1980 – Elzinga (2007), p. 143.
[60] Interview with Hans Oerter, AWI, Germany (Carsten Krueck, 28 October 1998, 13.00-15.00).

and, finally, a summary of what the long-term ice core record hitherto told about the global changes in the environment.[61] Scientific opinion-building and lobbying paid off. In the Autumn of 1988 the ESF general assembly agreed to fund the European Glaciological Programme. Field work under the auspices of GRIP began at the Summit Camp in 1989 with the erection of three dome-shaped buildings each two stories high. At the same time the GRIP Steering Committee (chaired by Bernhard Stauffer) applied for financial support from the EU (under the EPOCH programme) to cover 20% of the total costs, which was granted, making it possible for the project to proceed without delay.[62] ESF and EU backing also meant that Belgium, Italy and the UK as well as Iceland came on board.

Prior to this on the other side of the Atlantic Wallace Broecker, a leading American oceanographer, apparently fed up with the NSF/DPP's inertia took matters into his own hands and organized a two-day ad hoc meeting in Boston (January 1987) to see if earlier plans for European-US collaboration might be resurrected, but by then it was too late.[63] Dansgaard felt that too much time had already had been lost and surprised several American colleagues by suggesting that each party should drill their own core, and so it was decided. In the end it turned out to be fortuitous, facilitating comparison between two sites in Central Greenland not far apart from each other.

A Memorandum of Understanding (MOU) was suggested to regulate exchange between the two operations, including cost sharing of Hercules transport to Sdr. Strømfjord, Greenland on the basis of separate mission tasking and counting actual flight coordinated by PICO. The first draft of the MOU reflected Wilkniss' demand for a high degree of integration of the two projects, an approach rejected by the Europeans. They questioned the appropriateness of a formally cooperative agreement.[64] The differences were later ironed out at a new meeting (October 1988) where a looser and more flexible agreement was reached with side-letters to coordinate scheduling of logistics needs, compatibility and sharing of certain resources, including paramedic services, in the field.[65]

In the long run the difficulties that hindered further US-European collaboration within a single ice core-drilling project in Greenland were turned to advantage. European scientists found they did not have to rely primarily on the good will of the NSF in Washington if they wanted to realize their own plans. They got wind under their wings to go it alone. GISP had shown that they could develop their own drilling technology and that their scientific capabilities in some respects outmatched those of their American colleagues. Thus they pooled their resources in an all-European consortium instead in order to recover a deep ice core in central Greenland. In the

[61] Oeschger and Langway (1989).
[62] Bernhard Stauffer, "Introduction" in ESF (1996), pp. 3-5. This was affiliated with EPOCH = European Programme on Climatology and Natural Hazard.
[63] Wallace Broecker, from Interview on 2 July 1992: http://www.aip.org/history/sloan/icedrill/gisp2.htm. Accessed 13/1/08.
[64] This was at a meeting in Copenhagen early 1988, see Herman Zimmerman's letter to Peter Wilkniss: <http:www.aip.org/history/sloan/icedrill/euro-amer.htm#a4>. Accessed 13 January 2008.
[65] At a meeting in Grenoble October 1988: see foregoing note.

course of what turned out to be the successful Greenland Ice Core Project (GRIP) the vision of a joint all-European effort in Antarctica (a realization of the old idea of the EAP – see above) also began to materialize.

Two Parallel Projects, GRIP and GISP2

The Europeans started drilling early 1989 under the auspices of a new, this time all-European consortium consisting of eight countries, with Denmark (carrying 25% of the cost), Switzerland (23%), France (14%) and Germany (14%) taking the lead. Bernhard Stauffer from Bern was Chairman of the project. The Danes, apart from making the project politically possible (having jurisdiction over Greenland), provided the drilling expertise; the director of operations was Niels Gundestrup who had contributed to developing ice radar and the electronics for the electromechanical Danish ISTUK drill.[66] The British Antarctic Survey supplied one of its Twin Otter aircraft with pilot and mechanic for four field seasons.

The ESF-associated program was simply called the Greenland Ice Core Project (GRIP). The fact that the GRIP proposal was introduced to the European Commission (EC) in Brussels in the name of the ESF was unusual, but it helped avoid the kind of political rivalry that had torpedoed the EAP back in the early 1970's. Within the ESF an informal polar network that eventually emerged had taken on a more definite form as the ESF Network on Polar Science in 1986. Apart from GRIP it also spawned two other major co-operative projects for which funds were provided by the EC.[67] Thus the groundwork was established for channels and a common meeting ground between science and politics, more concretely in the establishment of a joint EC-ESF scientific advisory committee on ocean and polar sciences, ECOPS. Therewith the EU emerged onto the scene as an active player.

The US, with funding from the NSF, started drilling their parallel project GISP2 half a year after GRIP. GRIP reached bedrock August 1992, recovering a core of 3028.8 meters, while GISP2 hit bedrock July 1993 at 3054.44 meters, thus lagging behind by roughly a year but beating the competitive project in terms of core length. Thence two cores were available for analysis going

[66] Principal Investigators were as follows: Denmark – W. Dansgaard, C. Hammer, H.B. Clausen and N. Gundestrup; Switzerland – H. Oeschger and B. Stauffer, Physikalische Institut, Universität Bern, Bern; France – C. Lorius, R. & Delmas of the Laboratoire de Glaciologie et Géophysique de l'Environment, St. Martin-d'Hères and J. Jouzel, Laboratoire de Modélisation de Climat et de l'Environment, CEA/Saclay, Gif-sur-Yvette; Germany – H. Miller, AWI, Bremerhaven; UK – D. Peel, British Antarctic Survey, Cambridge; Itally – G. Orombelli, Dip. Scienze dell'Ambiente del Territorio, Milan; Iceland – S. J. Johnsen, Department of Geophysics, University of Iceland, Reykjavik; Belgium – R. Souchez, Dépt. Des Sciences de la Terre et de l'Environment, Université Libre de Bruxelles, Brussels.

[67] The European Polarstern Study (EPOS) in the Wedell Sea 1988/89 involving three expeditions carrying altogether 150 scientists from 11 countries in West and Central Europe, and the Polar North Atlantic Margin, Late Cenozoic Evolution (PONAM) with Norway, Sweden and Germany as the most active partners. Information from interview with Professor Gotthilf Hempel, Centre for Marine Tropical Ecology (ZMT), University of Bremen, Germany (Carsten
Krueck, 18/9/98); and interview with Dr. Carol A. Williams (Secretary to the EMaPS Polar Board) and Dr. Annette Moth Wiklund (Senior Scientific Secretary for Life and Environmental Sciences), both at the European Science Foundation, Strasbourg, France (Carsten Krueck, 16/12/98)

back 250,000 years. There was excellent agreement between the two records for the first 90,000 years BP; after that, and especially beyond 100,000 years BP there was discrepancy attributed to stratigraphic disturbances on one or both cores. The GISP2 core in particular showed strong indications of rheological disturbances close to bedrock. Both projects ended officially 1995 whence a new Danish led European consortium moved north and west of the old site on a new project, North-GRIP (1999-2003) setting a new record with the recovery of a 3930 meter long core. In terms of logistics Gundestrup was again the driving force in the field, both in GRIP and the NGRIP operation. When the EPICA and NGRIP projects came up Johnsen led the design of a new drill (Hans Tausen/NGRIP/EPICA drill) together with Steffen Bo Hansen; it is more suitable for cold Antarctic temperatures than the intricately designed ISTUK drill. When EPICA was initiated the Danish group was assigned the task of providing the drilling capacity for the project. The drill that was evolved now exists in several copies (long and short) and has also been used to recover the British drilled Berkner Island core and the Italian drilled Talos Dome core.[68] With Gundestrup chairing the EPICA drilling group the Danes naturally helped train most of the drillers that used the same drill design to recover the EPICA deep cores at Dome C and the DML Kohnen station.

Throughout the decade, despite the demise of formalized collaboration in the earlier US-European consortium, the European and American drilling teams at their two different sites by Summit enjoyed good relations with each other. Also, as it turned out two parallel ice cores so close to each other in the end facilitated better mutual calibration of chronologies and temperature curves. An important outcome was the identification of the Dansgaard-Oeschger events, rapid climate fluctuations during and at the end of the last ice age. These events were confirmed by a re-examination in the original GISP Dye 3 and Camp Century cores where they had been visible but not yet interpreted. This in turn prompted a re-examination also of the Vostok core taken in Antarctica.

Scientific and Political Groundwork for EPICA

In Antarctica Soviet-French collaboration that started in the early 1970's at Vostok (see above) proceeded in two phases, a first one 1970-1974, when a core of 950 meters was recovered, and a second one 1982-1983, when a section going from 950-2083 meters in depth was taken.[69] Vostok drilling finished in 1988 when the drillers took the last part of a further section down to 3623 meters. Ice core isotope analysis in this case was largely carried out at Claude Lorius' glaciology and geophysics laboratory in Grenoble leading to the famous paper in 1985 by Lorius and colleagues on a climate record in Antarctica going back 150,000 years.[70] In subsequent publications the analysis over then one climate cycle was confirmed and it was later pressed back to 420,000 years covering four glacial-interglacial cycles.[71] The core provided the first really dramatic evidence of a variation in tandem of temperature and atmospheric carbon dioxide over

[68] Johnsen et al., (forthcoming).
[69] Support came from the Arctic and Antarctic Institute of Leningrad, the Geographic Institute of Moscow, and the NSF in Washington.
[70] Lorius et al. (1985).
[71] Jouzel et al. (1987); Legrand et al. (1988).

this entire period. Here the work in Grenoble of Jean Robert Petit, first author on a now classical and highly cited paper was important.[72] In addition, Jean Jouzel, originally a chemical engineer who started ice core research in the mid 1970s in close collaboration with Lorius, was instrumental at the climate-modeling laboratory in Saclay (France) in developing complex isotopic models.[73] These were based on the use of models of general atmospheric circulation as well as their application in correctly interpreting the isotopic measurements obtained in polar ice. His analysis of the Vostok core helped make it a gold standard in the discussion of transitions between glacial and interglacial periods in the paleoclimate. Like Lorius he was also involved in Greenland where the GRIP and GISP2 cores similarly have given unprecedented detail of climate change over the past 100,000 years.

Taken together the Antarctic and Greenland core results were found to coincide when it comes to abrupt warming events at least for the last 60,000 years. Such findings served as an alarm clock in an emerging debate on future climate warming. Sigfús Johnsen, a veteran of ice core drilling in Greenland since 1969 and analyst of stable oxygen isotope records, in a comment 2001 summarizing findings from the GRIP core, emphasized how the ice cores "changed our image of climate…Before we had thought that climate needed 10,000 years to change. We found it could change in 10 to 20 years; it could switch from very cold to very warm. This shook everyone".[74]

The experience in ice core drilling accumulated by European scientists by the early 1990s warranted a return to the old idea of an all-European joint venture in Antarctica. The situation was completely different now compared to that in the early 1970s when the plan for an EAP had to be abandoned. As Heinz Miller told it, a new Antarctic project "was already there in our heads before we started drilling in Greenland."[75] The scientific arguments for a major Antarctic ice coring programme were strong. To avoid the mistake made with the EAP in the early 1970s leading scientists worked hard to anchor the idea politically. A number of contemporary events converged to make it easier. Within the International Council of Scientific Unions (ICSU) the International Geosphere-Biosphere Programme (IGBP) was initiated in 1986, and soon identified as one of its themes, "documenting and predicting climate change".

Within the UN framework the idea of an Intergovernmental Panel on Climate Change (IPCC) was implemented in 1988. European scientists were centrally involved in both of these developments. Paleoclimatology based on data from ice cores was important. GRIP (and Vostok) demonstrated that European expertise in ice core studies was excellent, logistics efficient and collaboration good. According to reliable assessments GRIP with its smaller drill and (4 inch) core gave a much better scientific payback per unit cost investment than the (6 inch) core

[72] Petit et al. (1999).
[73] The Laboratoire des science du climat et de l'environment (LSCE) at Saclay is part of the CEA-complex; CEA stands for Commisariat à l'Energie Atomique.
[74] Jack Williams, "Greenland should hold answers to climate puzzles", *USA Today*, 07/05/01; <http://www.ustoday.com.news/science/cold-science/greenland-2001/latest-reports.htm> Accessed 25/1/08; also see Johnsen, S. J., et al. *Tellus* (1992), B41, 452−468; Johnsen (1997).
[75] Interview with Prof. Heinz Miller, AWI, Germany (Carsten Krueck, 2/11/98)

brought up by the U.S. group with its larger and much heavier drill within GISP2.[76] SCAR's conference *Antarctic Science – Global Concerns* in Bremen 1991 helped bring polar researchers more closely into harmony with the international research programmes on global climate change.[77] The linkages with pertinent international programmes helped the paleoclimatic community establish credentials when they made their case in their respective countries' for a new collaborative ice coring effort on a grander scale.

Generally, some form of institutionalization is invaluable for large-scale projects in order to gain network stability, ensuring better continuity over time. At the European level this occurred in the creation of the European Committee for Ocean and Polar Science (ECOPS) in 1990 as a liaison (existing for five years) between the ESF and the EC's Directorate General XII (for Science) (EC/DG XII) constituted an ad hoc joint scientific advisory body at arms-length from politics.[78] Two important functions were served. First, as a hybrid forum of scientists-cum policy makers this became a vehicle for science diplomacy at national and intergovernmental levels. Secondly, the hybrid forum provided a neutral space where visions and project ideas could be articulated, tested and gain anchorage in the worlds of science and politics simultaneously, allowing for a co-production of new scientific and political orders. ECOPS's influence lay in suggesting and promoting Big Science projects. This was immensely helped by the fact that it was an ad hoc committee and had a very dynamic chairman, Gotthilf Hempel who knew how to cut red tape and lobby politicians. Being ad hoc, Hempel himself had the mandate to select the other nine members of the committee, thus circumventing the bureaucratic problems of appointing committee members via national representative bodies in different countries. ECOPS could operate quite freely and flexibly as a group of "wise men". It acted top down in identifying themes and sketching possible approaches to large-scale European projects and then elicited bottom-up input from scientific communities by broad consultations through workshops to develop special programs and networks around them. The very first workshop (1990) related to the ECOPS Grand Challenges thrust was on Antarctic ice cores.[79]

Still, EC politicians and bureaucrats were not immediately won over. In the very first round when a first phase for the European Project for Ice Coring in Antarctica (EPICA) was proposed

[76] Interview with Professor Bernhard Stauffer, Climate and Environment Physics, Physics Institute, University of Bern, Bern, Switzerland (Aant Elzinga, 26/8/98); the assessment may be quantified by counting and comparing the number of quality scientific papers (and their impact factors) coming out of the two projects.

[77] Hempel (1994). An important outcome of the conference was creation of the Group of Specialists on Global Change and the Antarctic (GLOCHANT) which in turn spawned a long-term project with six core projects, one of them on paleo-environmental records from ice sheets and marine and land sediments. The idea behind GLOCHANT was articulated during deliberations at a SCAR-sponsored workshop that took place at the Alfred Wegener Institute in Bremerhaven, 18-21 September 1991. At that workshop a regional programme of global research in Antarctica was defined, listing priorities, ongoing and planned international projects and other needs. The programme was summarized in a document that was accepted in principle by delegates at the XXII SCAR Meeting during July 1992 in San Carlos de Bariloche, Argentina – cf. SCAR (1993).

[78] Interview with Dr. Ibb Troen and Dr. Klaus Bruening, European Commission/Directorate-General XII, Brussels, Belgium (Carsten Krueck and Jutta Borchers, 9 June 1998).

[79] It was organized by Claude Lorius and held in Grenoble, France, 29-31 October 1990; *Modelling of dynamics of large polar ice sheets* was the name of another workshop, one organized by David Drewry and C. Doake in Cambridge, 29 April – 1 May 1991.

in January 1992 to the EC/DG XII, it was rejected. It was met with the argument that Europe is far away from and has nothing to do with Antarctica. Resistance hinged particularly on the extreme cost of the project, 8 million Ecu which at the time might have amounted to about 6 million US dollars, which was a large chunk and would eat into the potential budgets of other areas of European science, for example oceanography where there were also plans for new projects. The oceanographic research community was older, better established and strong in Europe. Thus EPICA had quite a number of opponents and doubtful friends in the beginning, at least when it came to proceeding from vision to action.

Hempel himself, being an ocean scientist, was at first not in favor of EPICA, but once he swung around he became a strong supporter. Although more or less neutral concerning the four suggested grand challenge projects his response to the bureaucratic inertia within the EU was important. Further lobbying occurred during the course of a symposium he organized in Obernai, France in October 1992, *European Ocean and Polar Science*. Here ECOPS met with about 50 chief administrators and scientists of national funding bodies, and a new draft proposal for EPICA was also presented to the EC. The timing was good. It followed upon the UN conference in Rio that marked an important turning point at the political level. The idea of global change began to take hold of politicians and countries needed to show that they took it seriously. The GRIP results were coming in, research in Antarctica gained media coverage and it became clear that uncertainties pertaining to climate change might be reduced by further work on ice cores. EPICA promised a much longer time series than what was available from Greenland. A new deep core was needed because the old Vostok one had a different resolution, it was different and lower, making it risky business to compare with the Greenland ice cores. In fact two new Antarctic cores were projected, one from Dome C where the bottom ice would be very old, and one with a higher resolution and reflecting the influence of the Atlantic environment, obtainable in the Dronning Maud Land sector where snow accumulation is much higher than at Dome C.

For the implementation of EPICA a conference (under the auspices of the European Science Foundation), *Ice-Sheet-Climate Interaction* in 1993 was very important, laying the groundwork for a breakthrough a year later in Bremen.[80]

ECOPS continued to flesh out four major projects. When summarized at the Grand Challenge Conference 1994 (Bremen) organized by the Alfred Wegener Institute (AWI) EPICA stood out as an absolute winner, a model project, well anchored in relevant scientific communities and politically opportune for Europe on the road after Rio. The enthusiasm, scientific prowess, personal persistence and diplomatic skills of a few leading scientists had paid off: Claude Lorius, the eminent glaciologist of Antarctic Vostok-core fame, David Drewry, a leading personality at the British Antarctic Survey (BAS) and Gotthilf Hempel, then head of AWI, the man with political acumen. Resistance still came from the oceanographic community that had their own grand challenge project competing for extraordinary funding. Years of networking activities orchestrated by the troika however now revealed itself to have been instrumental in fostering the bottom-up process of enrollment through the earlier series of European workshops and

[80] Bernhard Stauffer, personal communication 25 January 2008; Hempel (1996), pp. 9-24.

conferences. The relevant research communities stood sufficiently united, and policy support was forthcoming around a long-term commitment to deep coring in Antarctica. Coincidence with specific conjunctures in the upsurge of the global change issue together with integration with existing international research programmes, among other ones stemming from activities under the auspices of SCAR,[81] helped the process.

EPICA Established and Running

In 1995 finally EPICA was established as a joint ESF-European Commission (EC) scientific program funded by the Commission and ten national agencies.[82] Together with other initiatives it has propelled Europe into the position of a world leader in ice coring technology, research and analysis. During the past decade a multitude of publications have entered prestigious international journals, providing an increasingly rich picture of natural climate variations in Greenland and Antarctica, as well as intriguing linkages between the hemispheric records. Pilot drilling at Dome C (see map in Appendix below) started in the season of 1996/97 and after some technical setbacks and logistical difficulties came close to bedrock in January 2004 at 3260 meters. Even though the core is shorter than the Vostok one, the annual layers of ice are thinner and therefore the climate record from Dome C is twice as long. In the Dronning Maud Land sector, after four years of pre-site surveys, deep drilling started in 2000 at what is now called the Kohnen station (Appendix), reaching a depth of 2565 meters six years later. This corresponds to over 220,000 years of high-resolution temperature and greenhouse gas variation, thereby adding detail to the "younger" record. At both sites cores have been obtained with two similar electromagnetic drills. Their design drives from the experience accumulated with the drill developed by Danish scientists and engineers in the earlier Greenland enterprise already described above.

The ice core science and drilling efforts in Antarctica constitute a form of Big Science. More particularly they are a form of "distributive Big Science" different from the concentrated form of Big Science one usually associates with CERN or the European Southern Observatory (ESO). The following "Box" is intended in condensed form to highlight the division of scientific labour between countries in the EPICA effort.

The distribution of expertise across countries that are joined in different ways to implement EPICA include Denmark (Copenhagen University: gas analysis, ice core dating and the temperature record), Switzerland (Physics Department of Berne University: sophisticated gas analysis, reconstructing the life cycle of a gas and its interaction with other gases, interpretation, drilling technology), France (Deuterium analysis, stable isotope analysis, chemical analysis for Dome C), Germany (physical properties, and developing chemical analysis, logistics DML), UK (glaciology, chemical measurements), Netherlands (meteorological aspects and laboratory analysis), Sweden (glaciology and laboratory analysis of atmospheric parameters of the ice).

EPICA – a case of distributive Big Science

[81] Cf., for example, SCAR (1993).

[82] The participating countries' scientists publish under the collective name "EPICA Community". The consortium countries are: Belgium, Denmark, France, Germany, Italy, Netherlands, Norway, Sweden, Switzerland, and the UK.

In the Dome C case the major players are France and Italy, at DML/Kohnen it is Germany that dominates and organizes the logistics. Currently both stations are central points in a couple of ongoing traverses that are part of an international program (ITASE)[83] involving several nations during the Fourth International Polar Year (2007-2008) with the purpose of doing shallow and intermediate level drilling plus other activities along at least seven traverse lines, mostly across East Antarctica. Deep ice core drilling has become a mark of distinction signaling political power, logistical capacity and scientific prowess. Competition and cooperation include Europe/EPICA[84], Japan/Dome Fuji (the second highest dome)[85], and the U.S./Waiscore (see map in Appendix),[86] in the front rank, while China has recently joined the club with a new initiative at Dome A (see map), a site at the highest elevation yet where it is expected that a deep core may press the paleo-climatological ice annals back over one million years.[87]

Acknowledgements

I am glad to acknowledge encouraging comments from both Claude Lorius and Charles Swithinbank. Chester Langway sent me a copy of his recent account of the early history of ice core drilling (Langway 2008), which has been most helpful. After a reading a couple of draft versions of the present paper he has also been generous in providing many constructive suggestions, taking me to task on a number of inaccuracies and unfounded interpretations, all to the benefit of the attempt to reconstruct an important historical record. I also thank Sígfús Johnson for valuable comments that have prompted further corrections. Bernhard Stauffer likewise has provided a number of pointers that have been important for revising my account. I am also obliged to Margareta Hansson of the Institute for Geosciences at Stockholm University for supplying me with papers on the results of the Nordic ice-coring project on the Renland glacier in Greenland. Anders Karlqvist of the Swedish Polar Research Secretariat has been a source of information and encouragement over the years. The persons interviewed nine years ago regarding the emergence of EPICA are listed below – I wish to thank them as well as Carsten P. Krueck who conducted most of the interviews at that time. Reference to our joint paper within a EU-project (on climate as research and politics) led by Peter Weingart at the University of Bielefeld is provided below. As before I am also grateful to Tony van Autenboer (Belgium), and also Peter Abinck (University of Groningen), for information used to reconstruct a picture of the EAP, a subject that is dealt with in an earlier paper. I am keenly aware that many gaps still remain in the present account and assure everyone concerned no one but the present author bears responsibility for the interpretations (among other of quotations from interviews and the work of other authors) in the text.

[83] http://www2.umaine.edu/itase/content/Science/Proposed_routes.html Accessed 16 January 2008; Mervis (2007).
[84] http://www.esf.org/activities/research-networking-programmes/life-earth-and-environmental-sciences-lesc/completed-esf-research-networking-programmes-in-life-earth-and-environmental-sciences/european-project-for-ice-coring-in-antarctica-epica-page-1/more-information.html#c2252. Accessed 16 January 2008
[85] http://www.nipr.ac.jp/~ipy/sympo/proc-files/46-Fujita.pdf Accessed 16 January 2008.
[86] *http://waisdivide.unh.edu/* Accessed 16 January 2008.
[87] Jones (2007).

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- Professor Bernhard Stauffer, Climate and Environment Physics, Physics Institute, University of Bern, Bern, Switzerland (Aant Elzinga, 26/8/98, 14.00-16.00)
- Professor Gotthilf Hempel, Centre for Marine Tropical Ecology (ZMT), University of Bremen, Germany (Carsten Krueck, 18/9/98)
- Dr. Hans Oerter, AWI, Germany (Carsten Krueck, 28/10/98, 13.00-15.00)
- Dr. Joseph Kipfstuhl, AWI, Germany (Carsten Krueck, 28/10/98, 15.45-17.20)
- Prof. Heinz Miller, AWI, Germany (Carsten Krueck, 2/11/98)
- Dr. Carol A. Williams (Secretary to the EMaPS Polar Board) and Dr. Annette Moth Wiklund (Senior Scientific Secretary for Life and Environmental Sciences), both at the European Science Foundation, Strasbourg, France (Carsten Krueck, 16/12/98)

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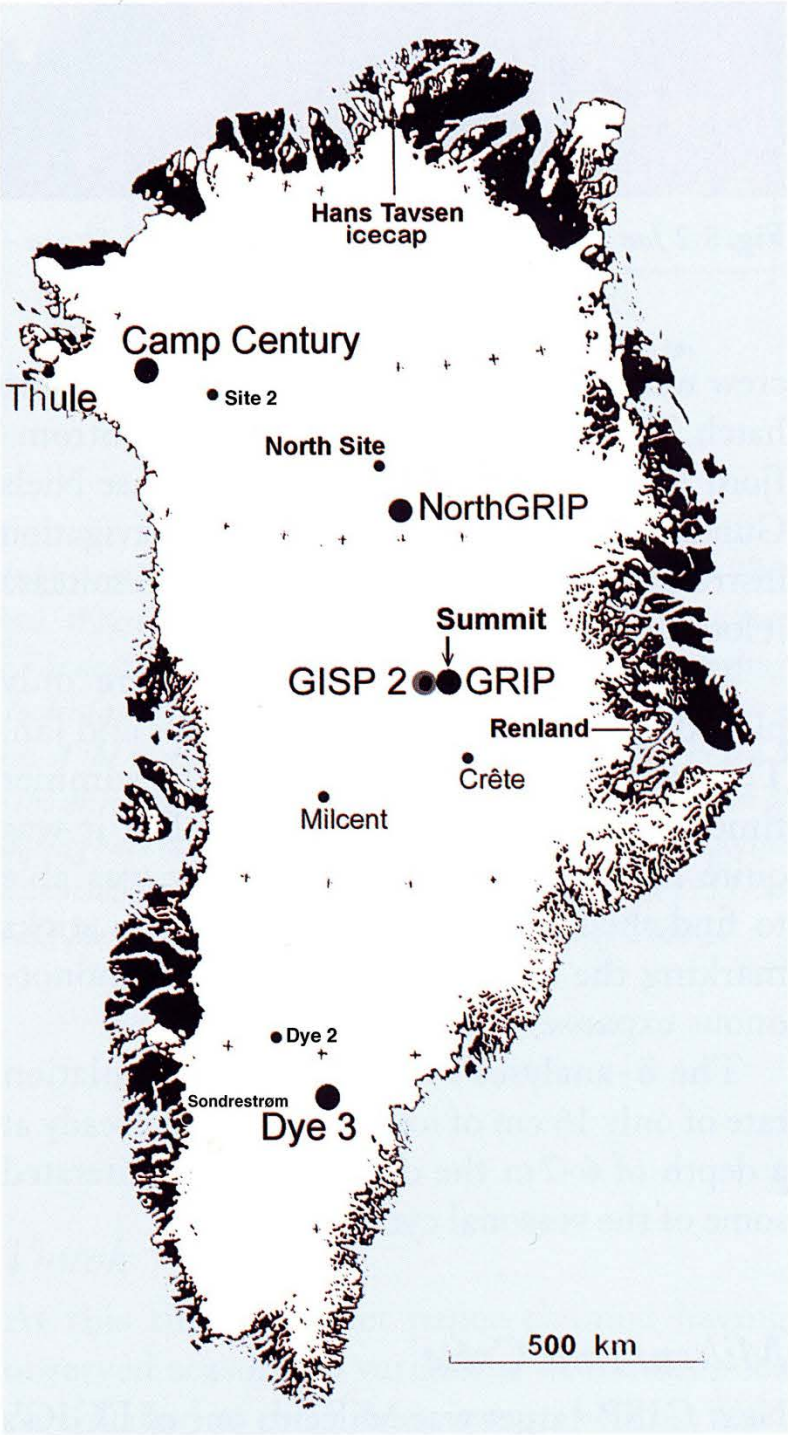
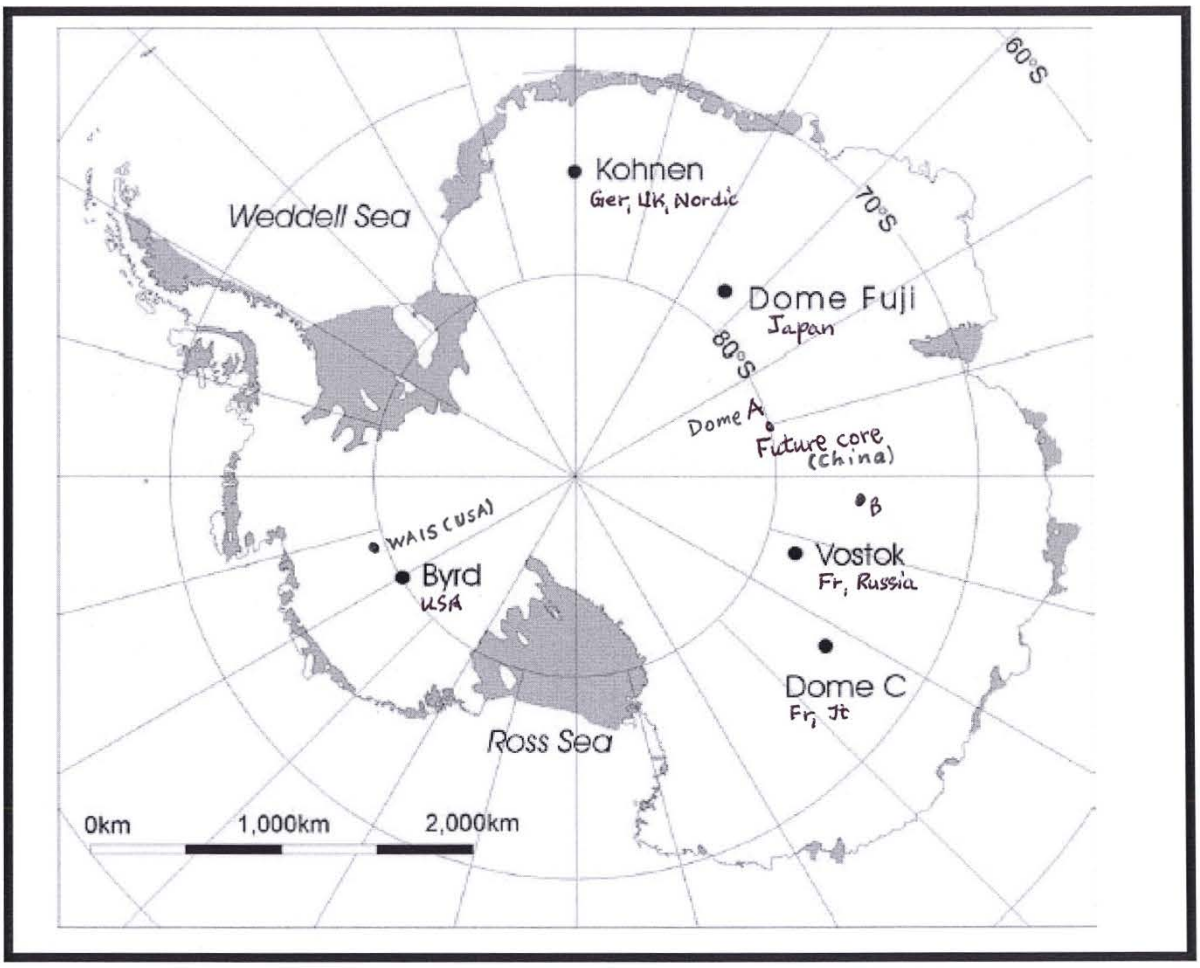
APPENDIX

Map 1. Greenland, the sites mentioned in the text (modified after Dansgaard, *Frozen Annals* 2004: 69)



Map 2. Antarctica, sites mentioned in the text



Deep ice cores in Antarctica

TOWARDS THE GREAT UNKNOWN:
THE SOVIETS PREPARE FOR THEIR THRUST INTO THE ANTARCTIC INTERIOR

Irina Gan

Abstract

National prestige and the desire to reap a rich scientific harvest were the forces driving both the Soviet and American expeditions in their quest to establish stations deep in the Antarctic interior in preparation for research to be carried out during the International Geophysical Year (IGY) of 1957 – 1958. While American historians and expedition members have left a record of the American IGY exploits, little is known in the English speaking world of the men of the first Soviet Antarctic expedition who landed on the coast of the Antarctic continent in January 1956. They quickly built their main base, *Mirny*, and as a result gained a firm foothold from which to launch out into the icy interior towards the South Geomagnetic Pole and the Pole of Inaccessibility. This paper uses Russian sources to trace the preparatory steps taken by these pioneers in their attempt to reach and establish scientific bases in those remote locations.

Introduction

In the history of Antarctic exploration, the quest to reach the South Pole was a singularly potent force impelling individual explorers to undergo extreme privations, endure hardship and risk death for the honour of being the first to attain that almost mythical goal. 'There was danger in it – and glory if the South Pole were reached. There was also a lot of scientific work to be accomplished... But even the most scholarly scientist could not resist the romance of the dream of reaching the South Pole, the uttermost part of the earth'.[1] For some, like Robert F. Scott, it was the desire to 'secure for the British nation the honour of that achievement' as well as to 'bring back a rich harvest of scientific results'.[2] For others, like Roald Amundsen, it was the aspiration to uphold his own prestige as a polar explorer[3] and scientific investigator. This endeavour in the name of science and personal or national prestige is the leitmotif running through the history of Antarctic exploration (if one puts aside the specific commercial incentives of the sealers and whalers), starting from Cook's second voyage through to the International Geophysical Year (IGY) of 1957 – 1958 when sixty seven nations of the world joined in a collaborative effort to study the globe with a special emphasis on Outer Space and the Antarctic. It was certainly manifest in the apparently somber scientific efforts of the IGY. In fact, it was a critical factor driving the programs of the two most powerful participants: the USA and the USSR, with their Cold War rivalries and competing political ideologies.

While discussing the American IGY Antarctic program, the veteran American Polar explorer and Officer in charge of the US Antarctic Program Admiral Richard E. Byrd, who burned with 'a fierce national pride', stressed his belief that '[t]o put down a base at the Pole and keep men living there will tax all our ingenuity and will in itself be a great national achievement'.[4] His

[1] Bixby (1961: 7)
[2] Mountevans (1958: 1)
[3] Amundsen (1959: 50)
[4] Siple (1959: 16)

interest in the Antarctic went far beyond the scientific interests of the IGY: Byrd was intensely keen for the Americans to establish a research base on the Geographic South Pole because he wanted it said that 'the US had done the impossible'.[5] Notwithstanding Byrd's desideratum, the scientists planning the American IGY program understood the immense difficulties involved in such a project and were not about to make a firm commitment to build a base on the South Pole without the full support of their government, which at that point demonstrated no particular interest in the idea.[6] However, a speech delivered by the Soviet delegate, Vladimir Belousov, at the First Antarctic conference of the Comité Spécial de l'Année Géophysique Internationale (CSAGI), the international planning body for the IGY held in Paris on 6-10 July 1955[7], was a defining moment for both the American and the Soviet Antarctic program. The American scientist Paul Siple recalls that Belousov 'dropped a bombshell' when he stated that the Soviets were planning to erect a station at the Geographic South Pole. '[A]ll eyes turned to the Americans for argument', but no argument ensued since 'the American delegation realized that the attitude of the American Government had not changed essentially' from its previous noncommittal stance.[8]

It was left to the conference chairman, Georges Laclavère to relieve the tension by telling the Soviets that the conference had 'accepted the offer of the US to erect and man a South Pole station', although Siple points out that 'we had not gone anywhere near that far, but now we were committed'.[9] Siple seems unaware that, according to New York *Times* journalist Walter Sullivan, the White House 'on the preceding March 28… had announced that there would be three American bases, including one at or near the South Pole'.[10] Sullivan also differs from Siple in that he considers that everyone at the meeting 'knew that this was where the US planned to go and suspected that Belousov knew it too. It looked as though Soviet – American rivalry… was now inevitable'.[11] In order to deflect and guide this rivalry to the benefit of the international scientific program, Laclavére astutely recommended that the USSR consider an alternative site towards the centre of the continent (at the Pole of Inaccessibility) where no station has yet been proposed, and an intermediate station in the vicinity of the South Geomagnetic Pole. The question as to whether the Americans had already decided on a base at the Geographic South Pole or whether the Soviets knew about it if they had remains a moot point; what is obvious is that the Americans were now committed to the idea. Belousov did not insist on the South Pole, but promised to bring back to Moscow the alternative recommendations proposed at the conference.[12] He was in no way confounded by Laclavère's suggestion, although the proposal to build and man a station at the most inaccessible point not only of the Antarctic continent, but of the entire planet, was an even more "impossible" task than the American commitment to the Geographic South Pole.

[5] Siple (1959: 16)
[6] Siple (1959: 98)
[7] Gan 2006, 2009
[8] Siple (1959: 99)
[9] ibid
[10] Sullivan (1961: 435 in Notes: Chapter 18, footnote 2)
[11] Sullivan (1961: 292)
[12] Sullivan (1961: 293)

When leaving the conference, Siple remarked that now there could be no backing away now from 'doing the impossible'.[13] This was also true for the Soviets, since many conference delegates considered their plans to be 'in the realm of fantasy'.[14] The chief of the Directorate of the Northern Sea Route (Glavsevmorput) Vasily Burhanov, who was one of the Soviet delegates at the Paris conference, recalled that a delegate from another nation showed him a map of Antarctica with the Soviet bases deleted. When Burhanov questioned his colleague as to why this was done, he was told that the harsh climatic conditions at the proposed sites could not support life. It was considered impossible for the USSR to establish bases in such a hostile environment.[15] However, like the Americans, the Soviets also felt that there could be no backing away from "doing the impossible'; national pride served to strengthen their resolve to embark on the scientific conquest of their own Poles: the South Geomagnetic Pole and the Pole of Inaccessibility.

Objective

While there is ample literature in English outlining the American attempt at conquering the South Geographic Pole[16], literature in both English and Russian outlining the Soviet effort has not been coherently organized and remains rather scattered. The aim of this paper is to construct a comprehensive record of the steps taken by the Soviet scientists in their attempt at conquering their Poles. Initial steps involved exploring the immediate vicinity of their coastal base *Mirny*, gradually extending further afield in order to observe and experience the conditions that would be encountered towards the interior of the icy continent. These preliminary exploratory steps resulted in an unplanned fortuitous outcome which was a significant achievement for the USSR: it became the first IGY participant to establish a manned inner continental station in the Antarctic. The Soviet Antarctic Expedition (SAE) also learnt some valuable lessons and drew conclusions from these observations and experiences which stimulated the development of new technology and tactics required to further advance the ultimate Soviet goal of building and manning bases on the South Geomagnetic Pole and the Pole of Inaccessibility.

This paper utilizes the written and oral recollections of several participants of the first and second SAE (Gusev, Dolgushin, Kapitsa, Kochetkov, Ruban and Tryoshnikov), documents from the Russian State Economics Archive (RGAE) and Russian State Archives of Contemporary History (RGANI) in Moscow; Arctic and Antarctic Research Institute (AARI) Fondi in St Petersburg, and secondary sources (Belov, Nudelman and Savatyugin) to construct the record of the beginning of the Soviet attempt at conquering their Poles. It traces how the Soviets established the first ever manned inner continental base on the Antarctic continent in which four men wintered during the austral winter of 1956.

Richard Byrd has the distinction of being the first to spend the winter alone at the American Advance Base on the Ross Ice Shelf located 175 km from the American coastal base Little America II (altitude 130 m) in 1934.[17] The Soviet party consisting of Station leader Alexandr

[13] Siple (1959: 99)
[14] Tryoshnikov (1963: 260)
[15] Cherevichniy (1963: 84)
[16] See Siple 1959; Belanger 2006; Dufek 1957; Dufek 1960
[17] See: Byrd 1938; Savatyugin 2007; Tryoshnikov 1963

Gusev (geophysicist) (Fig. 1), Leonid Dolgushin (glaciologist) (Fig. 2), Evgeny Vetrov (radio operator) (Fig. 3) and Nikolai Kudryashov (tractor driver/mechanic) (Fig. 4) has the distinction of being the first to winter over at the initially unplanned *Pionerskaya* station 375 km from the Soviet coastal station *Mirny* at an altitude of 2741 m on the Antarctic ice cap.[18] The lowest temperature that these men experienced on 20th August was -66.7° and a wind velocity of 10 m/sec.[19] Although Byrd spent most of the winter of 1934 about 10° farther south, he was almost at sea level and therefore at a much warmer temperature. At the latitude of *Pionerskaya* (69 °, 44' S) there are a few hours of daylight most of the winter; Richard Byrd was mostly in the dark all "day".[20] The exploratory steps and experience gained by the Soviets in establishing *Pionerskaya* station were vital for future Soviet progress in their push towards the South Geomagnetic Pole and the Pole of Inaccessibility and deserves to be examined in detail, which is the purpose of this paper.

Figure 1. Alexandr Gusev.
(http://www.aari.aq/default_en.html)

Figure 2. Leonid Dolgushin.
(Personal collection Leonid Dolgushin)

Figure 3. Evgeny Vetrov.
(Personal collection Leonid Dolgushin)

Figure 4. Nikolai Kudryashov .
(Personal collection Leonid Dolgushin)

Exploratory Steps

The primary task of the first SAE was to commence preparations for the Soviet IGY program by building a main base on the coast of Antarctica (*Mirny*) from which to launch their drive into the

[18] Lukin (2006: 435)
[19] Tryoshnikov (1963: 277)
[20] Behrendt. Private communication 30.01.2008

interior of the continent.[21] The operation was well thought out and organized as a series of exploratory forays, with each step expanding and building on the knowledge gained from the previous one. An integral role was dedicated to the aviation team led by Ivan Cherevichny (1909 – 1971) (Fig. 5), a veteran Arctic aviator who had flown in the North Polar region since the 1930s and had led an aircraft expedition to the Arctic Pole of Inaccessibility in 1941.[22] The SAE was supplied with six aircraft specially outfitted for polar conditions: four airplanes consisting of one Ilyushin 12 (Il-12), one Antonov 2 (An-2), two Lisunov 2 (Li-2) (Fig. 6) and two Mil' 4 (Mi-4) helicopters[23] which were to be utilized initially for reconnaissance and later for supply of the planned inner continental bases.

Figure 5. Ivan Cherevichniy

Figure 6. Left-Right (Li-2, Il-12, An-2 airplanes). (Personal collection Leonid Dolgushin)

After officially opening the coastal base named *Mirny* on 13 February 1956, the expedition leader Mikhail Somov set out on 24 February to search for a suitable site for the station to be built on the South Geomagnetic Pole on the Li-12 airplane crewed by Cherevichniy, Gury Sorokin and Dmitry Morozov. The round trip flight from *Mirny* to 78° S 106° E covered a distance of 2800 km and lasted 9 hours 40 min.[24] When flying over the first 500 km, it was noted that the sastrugi covered surface of the icecap rose steeply, while over the next 1000 km it flattened and gradually increased in altitude to the south to an estimated height of 3500 m.[25] Byrd had previously flown over the South Geomagnetic Pole and informed Somov that it appeared that it would be very difficult to build a base on the proposed site and offered him the best of luck.[26]

A triangular reconnaissance flight in the direction of the Pole of Inaccessibility (*Mirny* – 76° S, 79° E – 76° S, 98° E – *Mirny*) was made on 3 March[27] on the Il-12 airplane with the same contingent (except Sorokin whose place was taken by Aleksei Kash) and the surface of the ice cap was found to be similar to that noted on the previous flight. The Soviets used American maps based on US flights over the area in 1947 which indicated mountains situated 300 km from the coast. However, the Soviet party saw no sign of any mountains and decided that the Americans had mistaken a distant cloud bank for a mountain range.[28] Perhaps the Americans did see a cloud bank, but air navigation in 1947 and well into the 1960s was notoriously bad and errors

[21] Gan 2006, Gan 2009a, 2009b
[22] http://www.aari.aq/default_en.html Cherevichniy
[23] Cherevichnniy (1959: 140)
[24] Denisov & Bregman (1959: 440)
[25] Tryoshnikov (1963: 271)
[26] Stennogramma (10 April 1956)
[27] Denisov & Bregman (1959*:* 441)
[28] Tryoshnikov (1963: 271 -272)

of greater than 100 km in the reported location of mountain peaks actually seen and photographed were not uncommon.[29]

These exploratory flights provided useful information about the interior of the continent, but the scientific committee of the expedition decided that this information was still insufficient to fully understand the ground conditions where it was intended to build the bases. The committee determined that the next step was to actually try to land a party onto the sastrugi covered ice dome about 400 km from *Mirny* at an altitude of 3000m. The party was to spend several days studying the ice surface and the climatic conditions[30], especially the degree of air-cooling, radio reception and magnetic deviation. The implications of the results of these studies would have a direct bearing on the next planning stage.

On 5 March, the flight crew (Mikhail Chagin, Aleksey Chelyshev, Kash, Mikhail Kirillov) led by Gusev, who was an experienced alpinist[31], set out from *Mirny* on the An-2 ski plane (affectionately called *Annoushka*) and after two hours reached their proposed destination 400 km from *Mirny* where they attempted a landing and take-off maneuver.[32] The sastrugi were like 'frozen waves of an ocean'[33] and a lack of oxygen at 3000 m led to loss of aircraft engine power, which made landing and take-off an incredibly bumpy and protracted affair, though not a total impossibility.

At the location 70° 10' S, 95° 40' E, the party set up a hemispherical tent developed for use by the Soviet Arctic drifting stations and spent five days conducting observations in temperatures as low as -45 to -50° C, while the temperature at *Mirny* was -5° C.[34] Gusev relates that the temperature inside the tent never climbed higher than -30° C, even with the use of a propane/butane gas heater, due to the fact that the cold from the three kilometre thick ice dome penetrated through the tent floor which was covered with deer skins (Fig. 7). This was the opposite effect to what happened in the Arctic, where the tent floor in winter tended to conduct the warmth from the underlying ocean, which is always above freezing point.[35] The first taste of inner continental conditions: lack of oxygen due to the low air pressure at high altitude, extremely low temperatures and snow drifts which kept burying the aircraft indicated that the future work of the expedition would turn out to be unlike anything that these Arctic veterans had ever experienced.

Figure 7. Soviet Arctic tents.
(http://www.vokrugsveta.ru/vs/article/2797/)

[29] Behrendt (2005: 52-53)
[30] Gusev (1959: 53)
[31] Gusev (1973: 79-80); Kochetkov 1957
[32] Gusev (1959: 53-54)
[33] Kochetkov 1957
[34] Tryoshnikov (1963: 272)
[35] Gusev (1959: 56)

Preparatory Traverses

Initially, it was envisaged that the inner continental stations were to be built utilizing primarily the aircraft fleet for supplying building materials and labour.[36] However, after Gusev's short foray into the interior, it became obvious that this plan would need to be reassessed. The scientific committee of the expedition, after discussing the first experience of the interior work done by Gusev and the aviators, decided to send a traverse 'at least a small distance from *Mirny*' to do further research of the interior.[37] This was conveyed to the Minister of the Merchant Fleet responsible for the expedition, Victor Bakaev, who reported to the Council of Ministers of the USSR on 21st March 1956 that 'due to the immense difficulties of establishing the stations with the aid of aviation alone, a plan was prepared to use tractor trains which were to be supported by the aircraft. Having this aim in mind, the first 50-km long trial traverse into the interior to an altitude 900 m on two full-track all terrain vehicles was organized'.[38]

Prior to the traverse setting out, the area around *Mirny* was carefully explored, since it was known that the station was surrounded by a semicircular zone of crevasses. In order to find a safe route through the zone, glaciologists first flew over the area, after which they continued their observations on foot while roped together in case one of them fell into an unseen crevasse. They managed to locate a narrow passage between the crevasses 3 km west of *Mirny* suitable for the tractor sleds to pass.[39]

On 14 March 1956, a trial traverse using two red Gorky Automotive Plant all-terrain vehicles (GAZ 67) (Fig. 8) driven by Valentin Korsak and Konstantin Italiantsev and led by glaciologist Dolgushin accompanied by geophysicist Andrei Kapitsa, geologist Oleg Vyalov and journalist Evgeniy Ryabchikov left *Mirny* on their fifty kilometre journey. Every kilometre the vehicles stopped to put up a bamboo marker pole and take altitude readings. It was found that the ice dome rose fairly steeply to 400 metres over the first ten kilometres and then more gradually to 700 metres at the 50 kilometre mark.[40] The trial traverse had successfully negotiated the dangerous zone of crevasses and found and marked the exit to the plateau, proving that it was possible for the tractors to get through towards the interior.[41]

Figure 8. GAZ 67 all terrain vehicle. (Personal collection Leonid Dolgushin)

With the exit to the plateau marked, an improvised traverse with eleven men led by Mikhail Somov using two S-80 tractors which were originally intended only for unloading the ship, set out in late autumn on 2 April 1956 towards the point where the An-2 had landed a month before 400 km from *Mirny* at an altitude of 3000m. Three sledges carrying living quarters, scientific

[36] Bakaev (21 March 1956)
[37] Tryoshnikov (1963: 273)
[38] Bakaev (21 March 1956)
[39] Tryoshnikov (1963: 273)
[40] Dolgushin (2006: 60); Dolgushin (30 November 2007); Gusev (1973: 89); Kapitsa (2007: 72-73)
[41] Dolgushin (30 November 2007)

equipment, kitchen and food stores and 96 drums of fuel were attached to each tractor.[42] The traverse aimed to reach the planned destination and return to *Mirny* within 20 to 30 days.[43] Progress was very slow and treacherous: two men roped together walked ahead of their machines to look out for crevasses find a safe route[44] (Fig. 9), since men on foot could hear a hollow sound of a crevasse beneath their feet, whereas a 'tractor was deaf and blind'.[45] After travelling some 20 km, it became obvious that the weight of the cargo was too much for the tractors to handle and one sledge with a supply of fuel was uncoupled and left behind. This was to have repercussions for the future of the traverse.[46] Every 50 km, pyramid-shaped markers were placed on the ice to designate their route[47] and were later used to calculate the movement of the continental ice cover.[48]

Figure 9. Leonid Dolgushin and Mikhail Somov walking in front of the tractor train. (Personal collection Leonid Dolgushin)

On 11 April, 150 km from *Mirny*, weather conditions deteriorated rapidly and the traverse was almost buried by snowdrift caused by a blizzard which lasted for eight days (Fig. 10). On 19 April the wind died down enough for the men to dig out the snow-covered tractors and sledges and continue the journey.[49] For the next two days the traverse was on a 24 hour per day regimen, crossing an area of tall sastrugi until another blizzard again brought it to a halt. The fuel supply was becoming rapidly depleted and it became obvious that the traverse would be unable to reach the 400 km mark and return to *Mirny* as had been planned.

Figure 10. Snow-covered traverse. (Personal collection Leonid Dolgushin)

A Change in Plans

Somov recognized that the lack of fuel demanded a change in plans. He consulted with his colleagues and after further radio discussions with headquarters in Moscow decided not to turn the traverse back to *Mirny,* but to continue on as far as the fuel supply would allow. The tractors and sledges would be modified and reconfigured, further building and food supplies would be flown in from the main base and a temporary scientific observatory established in the interior of

[42] Gusev (1973: 86, 87)
[43] Gusev (1973: 86)
[44] Gusev (1973: 90)
[45] Ruban (1985: 121, 122)
[46] Dolgushin (30 November 2007), Gusev (1959: 65)
[47] Tryoshnikov (1963: 274)
[48] Gusev (1973: 92)
[49] Gusev (1973: 92-93)

the continent.[50] This was to be the first manned inner continental station built in the Antarctic interior and it would provide valuable knowledge about winter conditions at a location at such a distance from the coast. It was believed that these conditions would be similar to those to be encountered at their final destinations - the South Geomagnetic Pole and Pole of Inaccessibility, and that the experience and knowledge thus gained would be of benefit when planning for the more onerous task of reaching these ultimate goals. Considering the lateness of the season, the approaching Polar night and plummeting temperatures, the spontaneous idea of establishing a new base was quite a logistic challenge. It required immediate attention and necessitated Somov's presence back at *Mirny*, where he and Dolgushin returned on 22 April on one of the two airplanes that had flown in 700 kg of supplies[51], leaving Gusev in charge of the traverse (Fig. 11).

Figure 11. An-2 supplies the traverse. (Personal collection Leonid Dolgushin)

Every time the traverse stopped, snowdrifts covered the tractors and sledges and would need to be cleared away before the traverse could continue. Over the next three days it managed to cover about 75 km when the air temperature dropped to -60° C, causing the metal steering rods to become brittle and break. An attempt to replace them with metal cables was unsuccessful, since the cables 'snapped like cotton thread'[52] in the frigid temperatures. With the approaching Polar night, daylight hours dwindled rapidly and the men were forced to walk ahead in the beam of the tractor headlights looking out for crevasses (Fig. 12). A Li - 2 reconnaissance aircraft sent from *Mirny* on the 25 April advised that the traverse had successfully negotiated the crevasse zone and that there were no more crevasses to be encountered.[53] They pushed on and from 2 May began searching for a relatively level site suitable to build a base and a landing strip for an airplane to bring in supplies from *Mirny*.

Figure 12. Igor Ruban. Into the heart of Antarctica. (http://www.polarpost.ru/Library/Litinskiy/main-drifingrossiya.html)

On 4 May Gusev received a telegram from Somov advising him to halt the traverse. The traverse made a final stop at a position with the co-ordinates 69° 44' S; 95° 30' E, elevation 2,700 m 375 km from *Mirny* (Fig. 13). Provisions, building materials and carpenter Petr Firsov arrived from *Mirny* on the An-2 airplane and building commenced using the existing superstructure of the sledges and the newly delivered materials. After unloading, the aircraft attempted to take-off, but

[50] Gusev (1973: 94)
[51] Tryoshnikov (1963: 274)
[52] Gusev (1959:66)
[53] Nudelman (1959: 55); Gusev (1973: 97)

unluckily hit one of the surrounding sastrugi and sustained damage to its skis, which left it grounded until the damage could be repaired. Spare parts were sent from *Mirny* on 6 May and a 1300 m landing strip was prepared to allow the larger Li-2 airplane to land. While the strip was long enough for the plane to land and deliver its cargo, it was found to be not quite long enough for take-off and the Li-2 also damaged its landing gear, though not badly enough to prevent it from leaving the same day with Boris Vtyurin, Mikhail Komarov and Pavel Senko on board.[54]

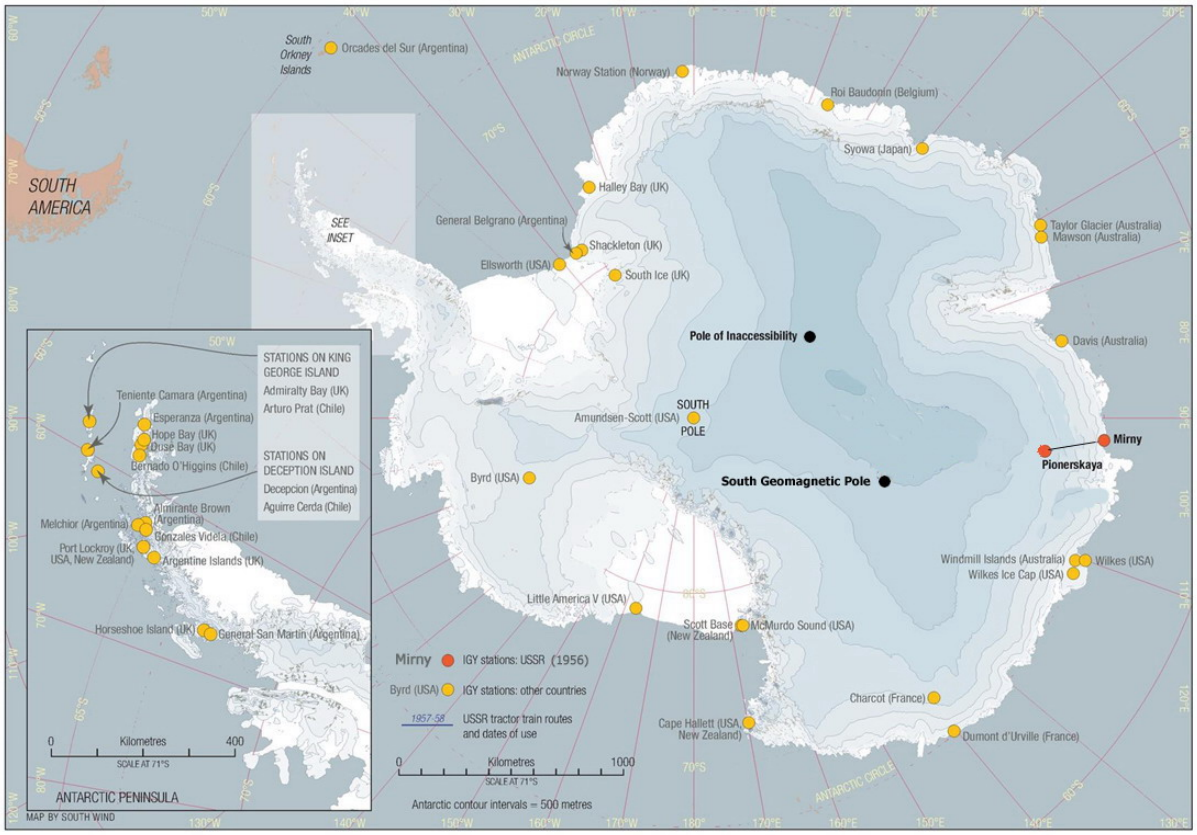


Figure 13. Map of Antarctica showing traverse route *Mirny-Pionerskaya.* (Adapted from 'Map of Antarctic research during the IGY 1956 – 1959'. Moscow: Ministry of the Merchant Fleet of the USSR, 1959.)

The An-2 was repaired over the next eight days and on 14 May was able to finally return to *Mirny* with aerologist Aleksandr Shchekin on board, leaving six people to continue construction.[55] Supplies, however, were once again running out but the combination of foul weather and the darkness of the Polar night prevented any new deliveries. Only by the end of May did an aircraft manage to drop food supplies for the future station and Gusev became almost poetic when he described the sky opening up like a 'horn of plenty and many wonderful things… falling out': crates containing cans of meat, cocoa, condensed milk, sugar, sausages, packets of meat, chicken, bread and many other foodstuffs.[56] Unfortunately, the wind scattered the parachutes with attached crates over a wide area and considerable effort was expended in

[54] Denisov & Bregnan (1959: 443)
[55] Gusev (1973: 99), Denisov & Bregnan (1959: 443)
[56] Gusev (1973: 105)

retrieving them. Building works continued and were at long last completed by 27 May 1956, when the first Soviet Antarctic inner continental research station was officially opened (Fig. 14). It was named *Pionerskaya* as a dual tribute to the pioneering achievement of the Soviet expedition in the Antarctic and to the communist children's' organization, the 'Pionery' (Pioneers). The first step to the Poles was symbolically likened to the child's first step towards becoming a fully fledged member of the Communist Party.

Figure 14. Igor Ruban. *Pionerskaya* station. (http://www.polarpost.ru/Library/Litinskiy/main-drifingrossiya.html)

On 6 June, pilot Cherevichniy flew in on the Li -2 aircraft with supplies and exchange personnel, but the landing strip was obliterated by a blizzard which covered it with sastrugi. He was unable to make a landing and returned to *Mirny*. The men at the station worked on the strip over the next 24 hours and succeeded in preparing the surface for another attempt at landing on 7 June, which this time was successful. More supplies and equipment were delivered, as well as two men who were to stay the winter: radio operator Vetrov and glaciologist Dolgushin. The An-2 plane, which was expected to bring two barrels of fuel and a tractor driver/mechanic to replace Kudryashov was unable to locate the new station and barely made it back to *Mirny*. Vitaly Babarykin, German Malikov, Kapitsa and Firsov returned to *Mirny* on the Li-2[57], leaving four people to winter in the Antarctic interior: station leader Aleksandr Gusev, tractor driver/mechanic Nikolai Kudryashov, glaciologist Leonid Dolgushin and radio operator Evgeny Vetrov. These Antarctic pioneers were to spend the next five winter months with no other human contact until 17 November 1956 when the An-2 arrived with a relieving party, although air drops of provisions and fuel were effected on 22 June (1 ton of provisions), 28 August (Li-2 provisions and fuel) and 5 October (Il-12 1.8 ton cargo).[58] Meteorological, magnetic, astronomical, glaciological, aerological and other scientific observations were constantly conducted both while the traverse was travelling and after it was transformed into a base and settled in for the winter.

Conclusion

Back in Moscow, at a meeting on 10 April 1956, Glavsevmorput was most impressed with the progress of the traverse. The push south with winter rapidly approaching was acknowledged to be 'an unprecedented undertaking... which was undoubtedly worth the whole expedition'.[59] Somov also appreciated the importance of this first foray into the interior: he understood that 'observations conducted in *Mirny* and *Pionerskaya* will shed light on the possibility of a lengthy stay of men in the regions situated still closer to the centre of the continent, and help to solve the question of whether future plans for advancing to the south... are practicable'.[60] Many lessons were learnt with regard to inner continental Antarctic topography, temperature, climate, human

[57] Denisov & Bregman (1959: 444)
[58] Denisov & Bregnan (1959: 445, 448, 449)
[59] Stenogramma (1956: 69)
[60] Somov (1957:1)

endurance and about the limitations of the equipment required to operate in such extreme conditions. These lessons were invaluable in future planning, design and development of new more suitable equipment, clothing and selection of personnel.
The significance of the Soviet achievement not lost on the neighboring IGY national Antarctic expeditions which would also benefit from the Soviet experience. Bill Bewsher, the Officer in Charge of the Australian *Mawson* station, sent a radiogramme to the newly opened station expressing his 'hearty congratulations on the successful establishment of Pioneer [, a] fine accomplishment soon after the establishment of *Mirny*'.[61] The Australians were thankful that they were able 'to draw on Russian experience with long-distance heavy tractor transport on the Antarctic plateau. The information gained proved useful when we undertook our inland journey'.[62] The French base on Terre Adélie also sent congratulations and asked the Soviets to share with them the 'conditions and with which means you could success in the building of your station (sic)'.[63] Commander Herbert Whitney, the American naval officer responsible for all Antarctic naval station construction wrote in Russian that 'we consider your operations to be very interesting' and wished them all the best from the US expedition.[64]

The first SAE had not reached either the South Geomagnetic Pole or the Pole of Inaccessibility, but a promising start had been made. A 'large and elaborate' coastal base *Mirny* [65] had been established from which to launch their assault on the interior. Their airplanes had made a reconnaissance flight to the proposed station site at the South Geomagnetic Pole and another towards the Pole of Inaccessibility. A small party had landed on the Polar plateau and spent several days conducting observations. The area around *Mirny* was explored, a way through the surrounding crevasses was found and a short trial traverse had marked an exit to the plateau. A larger traverse had used the exit to the plateau to travel 375 km into the Antarctic interior and build the first inner continental Antarctic station which was to be manned year round till the end of the IGY (Fig.15).

Figure 15. Postal stamp on the occasion of closing *Pionerskaya* station.
(http://www.philately.h14.ru/antarkt.html#a11)

This unplanned station, *Pionerskaya* had given the SAE a head start in preparing for its national IGY programme and had provided vital experience which was critical for successfully reaching its goal of building bases on the South Geomagnetic Pole and the Pole of Inaccessibility. But it was the men of the SAE who strived to secure for their homeland the honour of achieving their

[61] Kochetkov 1957; Gusev (1973: 106); see also Gan 2009
[62] Mather 1957
[63] Kochetkov 1957
[64] Kochetkov 1957, Gusev (1973: 106)
[65] Law 1956

goal and to 'bring back a rich harvest of scientific results'.[66] Like Scott, Amundsen, Byrd and others who went before them, they displayed the same distinctive 'courage and endurance'[67] in their attempt at 'doing the impossible'.[68] And although *Pionerskaya* station no longer appears on contemporary maps of Antarctica, the route travelled by the first Soviet explorers is still used by the annual Russian traverses to this day. Their story deserves to be told.

Acknowledgements

I would like to thank Antarctic Tasmania (Hobart, Tasmania, Australia) for granting a travel scholarship to participate at the Third History workshop in the Byrd Polar Research Center, Columbus, Ohio, USA and also to SCAR for its assistance with further expenses during my trip. My sincere gratitude to one of the first Soviet scientists who wintered at *Pionerskaya* station in 1956, 97 year old Leonid Dolgushin, who shared his memories and photographs with me (Fig.16). Warmest thanks to his wife Veronika Filatova for her warm welcome to their home in Moscow.

Figure 16. .Leonid Dolgushin and author in Moscow (Photo by Veronika Filatova).

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THE AESTHETICS OF RISK IN POLAR EXPLORATION

Lisbeth Lewander

Introduction

Most people can easily conjure up the risks involved in doing science in distant polar areas. Would it not be safer, cheaper and more convenient simply to avoid situations that involve possible hazards, such as polar exploration? Thus, is there any logic whatsoever in consciously exposing oneself to such relatively large risks? In general, people are inclined to downplay the hazards and hardly hesitate to answer the latter question in the affirmative. Historically, several visitors to polar areas have stressed the heroism involved, thereby indirectly acknowledging the risks. At the same time, their risk propensity has been an issue in the travel reports. A related theme is the still frequent notion of polar areas as a reserve for 'real' men.

However, regardless of the temporal aspects and the various understandings of ideals of manliness and masculinity, most persons would agree that without a certain amount of risk-taking, little would happen in the way of scientific, societal or personal development. Future benefits, although not always clearly defined as to scale and scope, do require some degree of risk-taking. So why dwell on risks? Why not simply continue to improve risk calculations, assess the probabilities of hazards and/or casualties and get down to business – safe logistics and transportation in support of science? As for polar exploration, polar history is laden with more or less thoughtful risk and crisis management regardless of the existence or content of previous planning for risks and uncertainties.

The understanding and conceptualisation of risk assessment is therefore a crucial aspect of polar research, both its past and its future history. My somewhat explorative understanding is that it is plausible to present the subject in terms of the ideas held by individual explorers. The extent to which uncertainties and fears are spoken of and in what terms, may be treated analytically as the Aesthetics of Risk, reflecting a general level of actual security cultures in communities undergoing constant social change. These cultures of securities are there to be studied empirically, though that is not the task for this paper.

My argument is that risk assessments have been a crucial issue since the very beginning of polar research, although their wording and conceptualization have changed over time and space. However, due to hierarchies within the scientific communities and the logistic operators, risk communication used to be much more reticent than it is today. I have chosen to focus on some examples of the polar travel report story – telling with regard to risks. Most of my examples are from IGY participants from 1950 onwards; others date from the early 20th century, from expeditions that preceded this huge research effort in Antarctica. The paper will highlight brief descriptions of risk assessment situations, mainly from a single level of analysis, the individual. Other levels of interest would be the organisational and symbolical but they are outside the scope of this paper. As a healthy reminder of the links between today and previous eras, security and issues of risk seem to have been strengthening their positions vis-à-vis other issues on the agenda of scientific communities and Antarctic operators connected with the Scientific Committee of Antarctic Research (SCAR), since a new working group on these issues was set up as recently as July 2006.

Risk, Uncertainty or Fear – Changing Views on Risk Assessment

The social and political concerns with regard to risk assessment are caught by Jasanoff (1999), who describes the issue of risk in research as developing over time, from risks as hard, physical and difficult but still possible to calculate (by probabilistic methods used by experts) to risks seen and studied as historically constructed. Further, risk nowadays is a matter for laymen as well as experts and risks have specific cultural meanings for various social groups and individuals. Research on the implications of risk for modern society entered a new era with Ulrich Beck's (1986) *Risk Society* and Richard Luhmann's (1986) *Ecological Communications*.

At the time when the scale of polar research operations became increasingly large, Ortwin Renns (2006) commented that risks were an issue mainly for experts and politicians. Views on risks were rather mechanistic and probabilities concerned damage or loss of life and health as well as capital. Uncertainties were disregarded because they were alien to the statistical models of calculable causes and effects. Appraisals of risk resembled qualified guesses and risk communication was used to modify models in relation to dominant perceptions of risks. Opposition was regarded as irrational or biased. In contrast, recent general understanding of risk suggests that risk must be understood as relational between the source of potential harm/hazard, the objects/persons at risk and the evaluation of consequences. Today, the representation of risk is not just a matter for experts addressing other experts. Instead, the general public, through NGOs and media, participates in representing the objects of risk as well as the objects at risk.

Traditional views on risk communication from the late Fifties onwards also included a one-dimensional sender-receiver model. The notion behind this model was that the sender transmits a message through a particular channel and the receiver picks it up. If the message failed to elicit the expected response that was due to an unequal distribution of knowledge between sender and receiver; allegedly the receiver was less well informed than the sender. Another factor was the occurrence of distrust. However, recent understandings of risk communication pay more respect to "receivers". The general public is ascribed a greater amount of knowledge and seen as more worth listening to. Risk communication has ceased to be a matter of pure learning and become an issue of risk producers operating in more active cooperation with stakeholders of various kinds. Mutual learning and listening, as well as the political dimensions of risk communication, have come to the fore.

Another, still largely ignored, issue in risk research is the notion of gender's importance. Gender and risk issues (perception, assessment, management, communication, etc.) make up a growing research area, whereas the notions and understandings of masculinity/ies and femininities are part and parcel of the actual construction of risk. For gender aspects in polar research, see Berg (2007) and Lewander (2004).

Risk is not the same as uncertainty, which is harder to come to terms with and should therefore be handled by being prudent. Fear may be elicited by assumed risks as well as uncertainties but pertains largely to the emotional sphere. However, received notions of rational decision-making do view emotions as a limiting factor (Douglas 1994, Eldh 2004). Thus risk, although socially constructed, is connected to some kind of event that can be, at least partially, foreseen. So in theory, risks can be both calculated and managed. However, as this is often neglected, I find it important to proceed with the argument for an aesthetics of risk.

Fragments on Risk Assessments Prior to the IGY

In my first example of the portrayal of early 20th century risk assessment, from the Swedish South Pole Expedition, we find that contingency plans actually were elaborated, though not fully developed. This section, which is a partial excerpt (Lewander 2007), illustrates the mode of considering risks:

Otto Nordenskjöld's Swedish Antarctic Expedition 1901-03

In a letter of January 25th 1948 to Eric Ljungner, expedition member José Maria Sobral was very upset and referred to another member of the expedition, Johan Gunnar Andersson, as *"this weird mahatma, Andersson and his hardly less significant idol Carl Anton Larsen were close to causing a disastrous end to the Nordenskjöld expedition. Of course, he does not write anything about this."*

Sobral is referring to the official travel account by Nordenskjöld, Andersson and others (pages 190-204), in which Andersson describes what happened when Andersson, Duse and Grunden were put ashore at Hope Bay on December 29th, 1902 (Nordenskjöld 1905, 203).

1) Only the *Antarctic* reaches the winter station: If the land party has not reached the winter station before January 25th, one has to assume that the land party had not managed to cross and should therefore looked for on the site of the depot (Hope Bay).
2) Only the land party reaches the winter station. If the *Antarctic* by February 10th has not reached the winter station, all persons present at Snow Hill would walk by land, heading for the site of the depot, Hope Bay.

Antarctic would then have to visit the depot site during the period between February 25th and March 10th and would not cease its search before this date without imperative reasons. *"These were our prerequisites when we went over the ice to reach Snow Hill."*

Sobral now proceeded to question the relevance of this plan. Sobral wrote that these two "*genial gentlemen*" had not foreseen that the *Antarctic* could be shipwrecked – which in fact happened.

With hindsight it is not difficult to agree with Sobral's assessment of possible outcomes for the expedition (Lewander 2004). In my interpretation, Sobral's scenario must be considered valid and therefore adds an important dimension to the earlier historiography presented by Andersson in relation to hazards. Risk assessments were made but the array of possible risks was not fully developed, either by scientist Andersson or by any involved institution. The unthinkable was not an issue in this particular aesthetics of risk.

Byrd's 2nd Antarctic Expedition, 1933-35

On this expedition, Richard Byrd undertook an excursion all by himself for several months, far away from the base camp. From his diary it is clear that the basic arguments for this were not about the necessities of science so much as Byrd's personal development (Goerler 1998, Byrd 1927). On this particular expedition the leader suppressed the perceptions of possible hazards, while his men, who realised how serious the situation became when Byrd fell ill, were forced to

arrange a rescue. Hazards with regard to heating equipment, as well as the lack of plans for rescue operations, highlight the issue of inadequate risk assessments by parties involved. Although the possibility of carbon-monoxide poisoning was known, it was not included in the overall planning. It seems to me that the heroic "lone man in the universe" was a dominant force in the actual aesthetics of risk.

The NBSX expedition 1949-52

As reported by Charles Swithinbank, a lethal accident occurred at the Maudheim base when a weasel was used for non-scientific purposes in the evening (Swithinbank 1999). Planning had been done for various hazards – but not for the ill-fated and presumably irresponsible actions involving the "human factor". Although the expedition was the outcome of an international effort involving several political, military and scientific institutions, there was no common denominator for risk assessments. Individual initiatives were crucial, which left scope for varying degrees of caution.

IGY – A Non-Risky Scientific Event?

Much of the history of the IGY remains to be produced. This was a large-scale collective, international enterprise within the framework of "scientists for the advancement of science and societal progress". It lasted from July 1957 to December 1958 and 68 countries took part with research programmes involving some 60,000 participants. The manpower involved in polar areas was just that: mainly men from the western hemisphere, although every continent had some degree of representation in the IGY. Some individuals in the Indian administration under Nehru had propagated the notion of Antarctica as a continent for peace. Meanwhile, President Eisenhower and the Soviet leaders were enmeshed in the Cold War. An American scientist, Lloyd Berkner, persuaded Norway and other western allies to participate in the IGY. Norway was unsure of both US and Soviet intentions as regards territorial rights, for instance Norway's claims to Queen Maud Land? Another issue was the long-standing conflict between Chile, Argentina and Great Britain with regard to the Antarctic Peninsula (Beck 1986, Lewander 2004).

Besides the internationally coordinated scientific effort, the IGY embodied competing objectives such as testing equipment for both civilian and military purposes; doing science not only for an increased level of world peace but for national armament; demonstrating technological and scientific capability on a world scale as part of the Cold War; establishing the right to existing or future territorial claims. These equally important objectives underpinned the entire IGY effort, alongside the quest for knowledge in fields such as geophysics, glaciology and geology. Interesting accounts of the political objectives are to be found in recent work on Swedish and Norwegian pre-IGY history (Elzinga 2006, Friedman 2004).

A contemporary commentator described the IGY as initiating the era of technological competition, where the Antarctic served as an arena for the demonstration of scientific and technological skills. Meanwhile, the Cold War build-up was causing great concern (Law 1959). Thus, the IGY was so much more than an *Assault on the Unknown* (Sullivan 1961), quite apart from the gender symbolism embedded in this title. Most accounts from the IGY, regardless of country of origin, present very specific demands on the type of person who was considered to be suitable for science in polar areas: white, heterosexual he-men is a concise but adequate label for

the construction of maleness and masculinity (Lewander 2004, Chipman 1986). Apart from arguments such as the lack of bathroom facilities, women's physical weakness and women as a psychological distress phenomenon in scientific stations, the resistance to female scientists and crew members was a symptom of the gendered structural imbalance in western scientific communities at the time. The United Kingdom and the United States were both slow to include women in the station teams. In my opinion, the US commander of Operation Deep Freeze, Admiral George Dufek, gave an accurate representation with his statement that women would "wreck the illusion of being frontiersmen going into a new land and the illusion of being a hero" (Dufek in *Sydney Morning Herald,*May 3, 1959, quoted in Robin Burns' article for the Encyclopedia of the Antarctic, 2007). Thus, risk assessments were based on notions of gender rather than on any empirical evidence of the actual risks involved in having men and women working side by side at scientific stations.

As for the occurrence of risk awareness, hindsight suggests that this was at least partially and/or occasionally absent in IGY planning. In modern terms, this absence may be labelled "epistemic risks" (Sahlin & Persson 1994). If the decision-maker is unaware of a risk, no further information will be sought and no alternative courses of action will be considered. This situation may occur in the absence of well-defined goals and clearly expressed values in relation to aims and internal priorities.

One of the members of the Swedish Arctic expedition to Kinnvika, Svalbard, in 1957-58 reported that no prefabricated plans existed aboard ship except in relation to the large transports. It was assumed that any other difficulties would be solved by "common sense". Instead of a planned preventive approach, there was a built-in reliance on the capacity and the propensity to act as the occasion required.

Another example was provided by Sir Edmund Hillary with reference to the preparations for establishing the Scott Base. Although planners had foreseen certain types of difficulty with regard to weather conditions, the impact of this prior knowledge on the operative stages seemingly was ignored. When serious inconveniences and setbacks led to the re-location of the base from Butter Point to Pram Point, the reader gets the impression that pure luck made this possible. On the other hand, some "mishaps" were foreseen. Some of the equipment had been tested in the course of training in 1956. Expedition members had learned to take care of the dogs and manage the tractors. Aircraft with ski-wheels were tested and found to be wrongly constructed. This had the positive effect that the men got practice in repair work in a cold climate (Fuchs & Hillary 1958).

The Post-IGY Portrayal of Possible Risks and Hazards

The textual aftermath of the IGY is somewhat piecemeal. Readers of the "full story" of the various expeditions that took place during the IGY are served a trial and error approach.

One example is the account, cited above, by the leader of the Commonwealth Trans-Antarctic Expedition. Four governments were involved, so issues of leadership were salient. The selection procedures for participants introduced a further element of coincidental effects. Besides having skills, previous experience and personal suitability, the expedition needed an acceptable composition of nationalities. Later, the selected persons were gradually made responsible for

choosing material and equipment and this had to be combined with the administration of gifts from private companies and industries. My proposition is that safety issues were of necessity a minor concern compared with the problems involved in actually obtaining the proper equipment and material. There is some explicit mention of the actual hazards created by the long lines of communication between isolated bases and population centres during the IGY, as well as the difficulties in supplying the stations, but it is notable that this was only after the successful completion of the IGY (Law 1967).

With regard to the issue of resource exploitation in distant areas, Frank Illingworth's report in 1953 admitted that commercial exploration of natural resources does indeed entail tremendous difficulties, for example non-existent harbours and moving ice, though the harsh weather per se would not stop rich mining ventures. In 1956 his view of the future was even brighter: *Who can say categorically that in time the vast resources of the Far South will not be broached by automation and atomic power? If they are, this great step forward will be due in part to the IGY* (Illingworth 1956, 582). This attitude of eternal progress was accompanied by lethal accidents during the IGY but according to Sullivan (1961, 298), "Such mishaps were due, essentially, to the novelty of the environment in which men and equipment had been called upon to operate." In other words, the accidents reflected a lack of experience rather than the absence of risk assessments. According to Sullivan, a gradual learning process was initiated.

As to the issue of responsibility, the reluctance of the military to take orders from scientists led to a dual leadership at the US stations. Problems that could not be solved at the station had to be referred to the Pentagon as well as to the National Academy of Sciences. Further, some unplanned journeys were made from the stations, without any notion of the risks involved. At least seven stations were damaged by fire, a hazard that does not appear to have been foreseen. Few precautions had been taken. The preparations and implementation of the IGY actually led to the loss of some 100 lives (Bulkely 2007).

The Norwegian IGY planners were very much concerned with protecting Norwegian territorial interests in both the Arctic and the Antarctic (Friedman 2004). An example of absent (explicit) risk assessment is provided by the choice of location for a base in the Antarctic. Ice conditions did motivate a particular location and these concerns were downplayed for political reasons. Norway and Great Britain finally cooperated with regard to the Norway Station, which was sited at the second best spot in relation to the foreseen hazards. It is only in the present decade that a full account of Norwegian participation has been presented.

An independent voice, the Swedish polar explorer Bertil Frödin participating in the Chilean expeditions to Antarctica in 1951 and 1953, raised the following rather unusual questions (and answers) about risk assessment at that time. First of all, Frödin states that polar exploration is dependent on more than technical equipment; the quality of men is equally important. Suitable skills are needed, as well as the right temperament (preferably mountaineering men with the proper fighting spirit) and the ambition to explore unknown lands, so that *everything else is of diminished importance and all efforts and difficulties to reach the goals seem irrelevant* (Frödin´s emphasis). Seemingly the heroic motive is not far away. However, Frödin then goes beyond the individual readiness to overlook possible risks to ask what people expect to find in the Antarctica; is it worthwhile risking life and spending capital, work and time on a sterile ice desert in a terribly hard climate? He also qualifies the local, individual risk assessments by putting them in

relation to risk perceptions in whaling and fishing, the emerging science of meteorology, future mineral exploitation, tourism and using Antarctica as a testing ground for atomic bombs (the USA, the Soviet Union and Great Britain). Frödin further states that the development of transportation and radar communication requires extensive polar research, both North and South. Each of the areas of interest pinpointed by Frödin is associated with notions of risk assessment, often by opponents of the respective activity. However, this is not fully developed in the text and Frödin concludes by viewing the IGY as a kind of high-quality culmination of all previous research efforts in the polar areas, although modern research is labelled earth magnetism, meteorology, seismology, vulcanology and oceanography (Frödin 1956, 217f). Here, Frödin highlights the growing degree of differentiation and specialisation that occurred during the launching of the IGY, while still keeping in mind the practical purposes linked to each of these labels. Still, a comprehensive risk assessment is subordinated to the expected benefits.

What conceptualisation attended the planning of the IGY? In what terms were the efforts framed in the vocabulary of risks and hazards in relation to the anticipated gains? My impression so far is that the issue of uncertainties was somehow transformed into the issue of risks but that this did not happen until after the scientific and logistic operations had taken place. Certain risks and their levels were tacitly accepted, others were not considered at all. One very particular kind of risk in relation to the IGY was the ongoing Cold War.

Risks and Superpower Involvement

The idea of the IGY coincided with an extremely serious superpower crisis, the Korean War. Moreover, the non-settlement of territorial claims in Antarctica had become an issue for the US State Department. An IGY veteran with close ties to the Army´s research program, Paul Siple, describes how the launching of the IGY was soon accompanied by a renewal of US national interest in the Antarctic. Initially, planning processes for US commitments within the framework of the IGY were in progress side by side with those led by the State Department. Siple describes how two cultures and two missions were to cooperate during the IGY (Siple 1959).

As for the US Army and Navy, I suggest that risk issues were incorporated in accordance with the principle of standard operating procedures (SOP). The NSC's governing decision (NSC 5424/1), together with the US Defense Department's "Master Plan for Antarctica" for implementing the NSC decision, provide intriguing insights into the safety culture behind the western superpower's immense efforts at the time. The Staff Study, later to become the governing decision, presenting the rationale for US involvement in Antarctica during the IGY among other areas of interests, clearly reveals the non-existence of an organising body for Antarctic activities (NSC 5424/1 28 July 1954). In this context it should be noted that, besides the scientific undertakings, Antarctic activities included the logistic operations, the possible use of nuclear energy and all sorts of activities planned for the IGY by the US. The explicit notion of risk is rather absent. So what about the Defense Department's considerably more operational Master Plan? The Plan consisted of six sections:

Objectives	Requirements	Budget
Programs (Courses of action)	Assets	Schedule

(OCB, US Department of Defense, 17 Sept 1954)

In the Master Plan, several of the weak points or areas regarded as potentially important for decision-making and policy-formulation with a direct bearing on risk assessment and safety procedures were simply reduced to nothing. This does not mean that precautions were non-existent. Rather I would suggest that risk assessment had a rather low priority at the time. Supplies were dimensioned for two years instead of one, in case the resupply ships failed to turn up, but the material I have come across so far does not include any profound, highly visible plans or preventive routines for accidents, mishaps etc. However, plans were made for emergency lines of communication:

> *...we told of the kinds of equipment, such as planes, dog teams and radios, we would be able to make available in case of emergency. But far more important than these were the discussions as to methods of making simultaneous standardized scientific observations in our various fields of activity* (Siple 1959, 98-99).

Nor were any long-term hazards or risks foreseen with regard to the environment or the psychological well-being of the scientists. Some psychological studies were made but not for dealing with any actual risk in relation to the IGY. Instead, new studies were carried out on the effects of isolation. Extreme weather conditions were expected, as well as being cut off from supply lines. Military logistic planning was a dominant feature of the major US engagement in the IGY (see for example Navy Statement for Antarctic Program FY 63).

The decision to locate a US station at the geographical South Pole was driven by the Soviet Union's announcement of plans to establish a station at the very same spot. After diplomatic intervention, it was agreed that the Soviet Union would opt instead for the magnetic South Pole. With regard to risk assessments, both the US and the Soviet Union had other priorities, namely their overall competition for superpower status. Although several veterans actually warned decision-makers about the hazards of such isolated locations, these risks were scaled down. Siple specifically notes that the input of veterans, i.e. men who have led or worked on previous polar expeditions, tended to be overlooked for reasons of prestige (Siple 1959, 93f). Despite warnings from Siple to the National Academy of Science and the State Department, a US station at the South Pole was a top priority.

The Aesthetics of Risk

The first component of a possible aesthetics of risk is the occurrence of risk awareness as such. Firstly on the individual level, among scientists and science administrators, secondly on the organisational level. For the purpose of this paper, the latter was reduced to the combined national representatives on the various national IGY committees regardless of their original institutional ties. However, these ties are not unimportant because the scientific community, the several governmental agencies and the logistic operators (often military at the time) had conflicting interests and objectives with their engagement in the IGY. Thus, the possible levels of risk needed literal negotiations. Nevertheless, within the framework of the IGY, there was at least a temporary consensus on the combined national achievements to come. In the end, or perhaps rather in the field, individual judgements were made in each "critical" situation involving a planned or unplanned risk assessment.

A second component is the content of such awareness. What kinds of risk were perceived and by whom? What were the objects of risk? What kinds of risk were downplayed and to what extent as they refer to time and space? What degree of severity was expressed? How were issues of responsibility and liability addressed?

A third component is the presentation of possible solutions in the sense of alternative courses of action. What characterized the contingency plans and to what extent were they elaborated on beforehand as to details about safety measures and decision-making? Was there a preference for identifying problems or for solving them? Extended stays were often on the agenda within the framework of standard operating procedures but apart from that?

A fourth and last component, pertaining to the last two decades, is risk communication and preparations for crisis management. What was to be said, to whom and by what means? What roles had been allocated to the various stakeholders, actual or potential, if any? Was there any notable difference in how a particular risk was portrayed before and after the IGY?

Conclusions

A perusal of travel reports from polar history, from the late 19th century until today, leads to the conclusion that the aesthetics of risk, regardless of time and place, more often than not includes a particular repertoire of identifying and coping with risks. Further, there has been a growing concern with cost-benefit analysis. Today, Antarctic operators have to deal with a range of interested parties, more or less attached to the formal structures of the SCAR and the Antarctic Treaty, as well as with the general public and the media. Further, there is a wider repertoire of voiced opinions about the occurrence and content of risk. Such voices were already heard at the time of the IGY but the arenas for them were different; assessments of risks versus benefits were aired with other tunes. There was no politicization of either the object at risk (scientists, logistic staff, local environment) or the object of risk (extreme weather conditions and access to equipment to counter any calculated adverse effects). In the early Fifties, the concept of risk was therefore current in a very limited social sphere; military/logistic experts and scientists formerly active in polar research conducted an internal dialogue or a one-way communication from defence departments to scientists in the field. Risk assessments were mainly confined to issues of supply lines and lines of communication between bases. The temporal factor was present. At the same time, the themes of risks and uncertainties were constantly present in relation to superpower conflict, particularly in the USA and the Soviet Union. These fears seemingly overshadowed the more concrete, down-to-earth hazards associated with the extreme climatic conditions of Antarctica.

Although most commentators and scientists alike made frequent references to climate, very little time, resources or media space were allocated to considering the degree of risk in relation to the impressive undertakings in advance of the IGY. Further, I have not yet come across any planning about the levels of risk that could be considered acceptable.

This attitude of optimism and faith in unlimited progress would cause an outcry today. Media, public opinion and concerned scientists, among others, would demand governmental responses, and risks would be communicated (and negotiated) widely. The various national and international campaigns during the planning for the IGY were different – no local, not to mention global, risks

of a personal or environmental nature were judged to constitute hazards that warranted a public discussion. Further, the management or regulation of risks and uncertainties was still mainly a matter belonging to those attending to logistic needs.

The point of departure for this paper is the notion of aesthetics of risk in relation to a general level of a security culture that is present in all types of societies, regardless of their degree of economic and political development. The extent to which there is always a gap between risk propensity and societal development is an open question and risk assessment has featured in some respects in most polar explorations from early times up to the present. However, this issue needs to be considered from a historical and a societal point of view. Important issues of logistics, transportation and safety are often taken for granted in the sense of being thought of as neutral, settled topics. Instead I would like to emphasize the need to dissect and problematize what I have labelled the aesthetics of risk. Further, the concept of "risk and risk assessment" needs to be explored in somewhat greater depth. In addition, the issue of risk communication will become increasingly salient since nowadays no polar exploration is likely to be carried out in the absence of such communication.

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SCAR Action Group History of Antarctic Research

3rd SCAR Workshop
on the
History of Antarctic Research

25 –26 October, 2007

Byrd Polar Research Center, Columbus (Ohio, USA)

Programme
Booklet of Abstracts

Venue: Byrd Polar Research Center, Scott Hall Room 108
1090 Carmack Road, The Ohio State University
Columbus, Ohio, 43210-1002, USA

Editor and layout: Cornelia Lüdecke, Munich, Germany

The 3rd SCAR workshop is supported by the Scientific Committee on Antarctic Research Cambridge (UK); the Byrd Polar Research Center and the Friends of the Byrd Polar Research Center, Columbus (USA); the Frederick A Cook Society (USA); Schimank-Stiftung, Hamburg (Germany); and Deutsches Zentrum für Luft und Raumfahrt, Oberpfaffenhofen (Germany)

Chronology

“Steps of Foundation of Institutionalized Antarctic Research”

1st SCAR Workshop on the History of Antarctic Research
Bavarian Academy of Sciences and Humanities, Munich (Germany)
2 – 3 June, 2005

“Multidimensional exploration of Antarctica around the 1950s"

2nd SCAR Workshop on the History of Antarctic Research,
Ministry of Foreign Affairs of Chile, Santiago (Chile)
21 - 22 September 2006.

"National and transnational agendas in Antarctic Research from the 1950s and beyond"

3rd SCAR Workshop on the History of Antarctic Research
Byrd Polar Research Center; Columbus (Ohio, USA)
25 – 26 October 2007

„Polar History and Institutionalization of Polar Research The International Polar Years“

Session planned during the SCAR/IASC 2008 Open Science Conference (OSC) on
“Polar Research – Arctic and Antarctic: Perspectives in the International Polar Year”
St. Petersburg, Russia
8 – 11 July 2008

Contact:
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"National and Transnational Agendas in Antarctic Research from the 1950s and Beyond"

3rd SCAR Workshop on the History of Antarctic Research
25-26 October 2007

Byrd Polar Research Center , Columbus (Ohio, USA)

PROGRAMME

Thursday 25 October 2007

9:30-10:00 **Registration**

10:00-10:30 **Workshop Welcome and Opening**
Raimund E. Goerler, Assistant Director of OSU Libraries, Byrd Polar Research Center, Columbus, USA
Cornelia Lüdecke, President of SCAR Action Group History of Antarctic Research, Munich, Germany

10:30-12:00 ***Session I***

10:30-11:15 **"What Has All This Got To Do With Science? The Rhetoric of Scientific Devotion in the Planning of the IGY'**
Peder Roberts, Department of History, Stanford, USA

11:15-12:00 **Playing Dice: Toward a Scientific Explanation of U.S. Leadership in the** Formation of the Antarctic Treaty of 1959
Jason Moore, Centro de Estudios Hemisféricos y Polares, Viña del Mar, Chile

12:00-14:00 **Lunch**

14:00-18:15 ***Session II***

14:00-14:45 **The Role of Antarctic Diplomacy in the Origins and Conduct of the IGY**
Rip Bulkeley, Exeter College, Oxford, United Kingdom

14:45-15.30 **The Search of an Organizational Framework for Antarctic Research (1948-1985)**
Jorge Berguño, Chilean Antarctic Institute, Santiago, Chile

15:30-16:00 **Coffee Break**

16:00-16:45 **Science as a Component of U.S.–Chilean Antarctic Relations in the 1950s**
M. Consuelo León Wöppke, Universidad Marítima de Chile, Chile

16:45-17:30 **The International Polar Year (1957-1958) as Reflected in German Media**
Cornelia Lüdecke, SCAR AG History of Antarctic Research, Munich, Germany

17:30-18:15 **Getting the Science Done: Perspectives from McMurdo**
Ann M. Dozier, T.D. Dye and N.P. Chin, University of Rochester, Rochester, New York, USA

19:00 **Workshop dinner at Holiday Inn on the Lane**

Dinner speech by **Tim H Baughman**, University of Central Oklahoma, USA
Amundsen, Cook and the Belgica, the first international scientific and multi-national expedition to the Antarctic

Friday 26 October 2007

9:00-12:30 ***Session III***

09:00-09:45 **The development of biology as a discipline in Antarctica**
Jason Davis, The Ohio State University, Columbus, Ohio, USA

09:45-10:30 **British Antarctic Science, 1944-1959**
Adrian Howkins, University of Texas at Austin, Austin, USA

10:30-11:00 **Coffee Break -**

11:00-11:45 **First (1957-58) Geophysical Investigation of the Filchner-Ronne Ice Shelf (FRIS)**
John C. Behrendt, University of Colorado, Boulder, CO, USA

11:45-12:30 **From EAP to EPICA: the shaping of a European Effort in Paleoclimatology**
Aant Elzinga, University of Göteborg, Göteborg, Sweden

12:30-14:00 **Lunch**

14:00-15:30 ***Session IV***

14:00-14:45 **Towards the Centre of the Great Unknown**
Irina Gan, University of Tasmania, Australia

14:45-15:30 **Swedish Polar Politics 1955-1970**
Lisbeth Lewander, University of Göteborg, Göteborg, Sweden

15:30 –16:00 **Coffee break**

16::00-17:30 ***Final conclusions and discussion about next SCAR Workshop during the 3rd SCAR Open Science Conference in St. Petersburg 2008.***

End of Workshop 17:30

Abstracts (Alphabetical)

Amundsen, Cook and the Belgica, the First International Scientific and Multi-National Expedition to the Antarctic

T. H. Baughman, Department of History, University of Central Oklahoma, OK, USA

No abstract provided.

First (1957-58) Geophysical Investigation of the Filchner-Ronne Ice Shelf (FRIS)

John C. Behrendt, INSTAAR, University of Colorado, Boulder, CO, USA and U.S. Geological Survey, Denver, CO, USA

The only major field project of the U.S. International Geophysical Year (IGY) Antarctic program was a series of oversnow traverses (Behrendt, 1998; 2003) mostly in West Antarctica, starting in 1957, making seismic Ice Shelf (FIS) oversnow traverse mapped snow surface elevation, ice thickness and bed topography of the Filchner-Ronne Ice Shelf (FRIS) area, as well as snow accumulation, the mean annual temperature of that era, and made a geological reconnaissance of the Dufek Massif. Results included the definition of the Thiel trough beneath the FIS and the maximum ice thickness of the southernmost area of the Ronne Ice Shelf (RIS) of 1300 m which is in contrast to 1100-m thickness remeasured by BAS for this area in 1994-95 of only 1100 m suggesting significant melting during the interval.

Filchner Ice Shelf Traverse, 1957-58
On 28 October, 1957, our five man party, co-led by Edward Thiel and Hugo Neuberg, left Ellsworth Station on the Filchner ice front with two Sno-Cats (in contrast to the usual three on the other US traverses) each pulling a 2.5-ton sled filled with fuel, food, explosives, and all of our scientific and other equipment. For the next 81 days we made a geophysical-glaciological reconnaissance of the Filchner-Ronne Ice Shelf area.

The logistics of the traverse oversnow traverse program were dictated by the fact that state-of-the-art electronics at the time depended on the vacuum tube, rather than the solid-state electronic microcircuits available today. The hundreds of tubes in our seismic system required large amounts of battery power. The power requirements, in turn, required two 250 amp-hour batteries weighing 80 kg each to produce the 24 volts necessary for operation. The only recording system was the heavy oscillograph "camera" with its tanks of photographic solutions. Altogether the seismic Sno-Cat carried a total load of about 500 kg of electronic equipment, gravimeter, magnetometer, and seismic batteries. Each Sno-Cat used about 3 liters of fuel per km or about 200 kg for a 50-km day for two vehicles. This fuel determined how frequently we needed resupply by the single-engine Otter aircraft available. These planes could only carry a few barrels of fuel in one trip depending on our range out of Ellsworth.

Although we commonly saw open crevasses on the traverse, the ones that gave us the most trouble were bridged with snow and could not usually be seen from the surface as we drove along. Sometimes we could safely drive across snow bridges, but other times we broke through. The Sno-Cats were nearly as safe as a man on skis because of their relatively low weight and four wide tracked pontoons. It is much easier to see bridged crevasses from the air, but this method is severely limited, even when a plane is flying directly over crevasses. We traveled in crevasse country most of the 81 days of the traverse and had a number of incidents of vehicles and sleds breaking through. One man fell in about 10 m, but was rescued safely.

We spaced seismic-glaciology stations at about each day's travel distance (~50-60 km). The measurements at these consisted of a seismic reflection sounding to measure the depth to bedrock; seismic measurement of the increase in sound velocity (and thus snow density) with increasing depth; and a two- or three-meter snow pit to measure snow accumulation and other glaciological parameters such as density and temperature. We would lay out our 330 m seismic cables in an L shape, which we unrolled from chest reels. We would then hand drill a 2–8m deep shot hole at the apex of the L. We fired a small explosive charge of 0.5-2 kg of ammonium nitrate detonated with an electric blasting cap and a 0.5-kg high explosive primer charge. The sound waves penetrated to the ice-water contact (in the case of the floating ice shelf) and to the water-rock (or ice-rock) contact and reflected back to the surface where they were picked up by the geophones. Each of the 24 geophones was attached to one of the channels in the cables. The seismic signals were amplified and recorded on photographic paper which spewed into my hand at 1 m/s. On a few occasions the wet paper record froze in my hands as I wrote the data on the back. There was some hazard associated with laying out the cables when we were working in crevassed areas. In these cases we skied, which offered some protection. We also used skis when we were not in areas of known crevasses, if the snow was soft.

In addition to a snow pit where stratigraphy leading to snow accumulation was measured, Neuburg and Walker, glaciologists, would hand drill a hole 9 m deep and place an electric-resistance temperature probe on a cable in the bottom. We made gravity and magnetic and altitude measurements every 8 km to study the variations in density and magnetic properties of rock beneath the ice, and therefore to make inferences about the ice-covered geology. We also used the gravity data to determine the depth to bedrock between the seismic reflection stations.

Conclusions

I will discuss results of this first reconnaissance of the FRIS system including the definition of the Thiel trough beneath the FIS and the maximum ice thickness of the southernmost area of the FRIS of 1300 m which is in significant contrast to BAS remeasurement (Johnson and Smith, 1997) of this area in the 1990s of only 1100 m suggesting significant melting during the interval.

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The Search of an Organizational Framework for Antarctic Research (1948-1985)

Jorge Berguño, Chilean Antarctic Institute, Santiago, Chile

This presentation is focussed on certain elements of the protracted Antarctic negotiations leading towards the signature of the Antarctic Treaty which have been generally neglected or, at least, not sufficiently emphasized in the literature on the subject. These elements concern the type of scientific organization most suitable for the conduct of cooperative scientific activity in Antarctica. While scientific cooperation stemmed from a long tradition in Antarctica and all parties to the "Antarctic dispute" readily accepted that such cooperation was indispensable and stood as the cornerstone of any agreement or regime for Antarctica, the same consensus did not exist regarding the various models being proposed for a possible structure and management of Antarctic science.

The 1948 American proposals for a trusteeship, and after the rejection of the UN mechanism, for a condominium, presented by Caspar D. Green of the US State Department to the Chilean and Argentine Foreign Ministries during visits made in July 1948 to Santiago and Buenos Aires, circulated as well to all Antarctic claimant States through their Diplomatic Missions in Washington, D.C., were made under the assumption that an international administration for the Antarctic continent and sub-Antarctic islands would strongly promote the further systematic scientific exploration and investigation of Antarctic phenomena, including correlation of meteorological observations of practical significance in long range weather forecast, particularly for countries of the Southern Hemisphere.

The US draft Agreement, in its Article III, created an Antarctic Commission which would constitute the government of the territories under its charge with full executive and administrative powers. The Commission, through a Scientific Board or other appropriate agency, would draw up plans for exploration, investigation, and scientific and technical development. Such plans could be carried by all or some of the Commission Members and projects of the individual members could be fitted into them. The Commission would prescribe appropriate procedures and conditions under which States and privately supported expeditions would be allowed to conduct scientific research, develop resources and carry on other activities consistent with the purposes of the Agreement. Parties to the Agreement had to pledge and insure that their undertakings in Antarctica were consistent with the agreed plans.

The rejection of this Agreement by most claimants, with the qualified exceptions of Britain and New Zealand, was mostly aimed at the objective contained in Article II of the draft Agreement: "..the parties hereto merge and join their claims to, and interests in, specific portions of the area covered by this agreement ("the Antarctic Continent and all islands south of 60º south latitude, except the South Shetlands and South Orkney Groups) and vest such individual claims and

interests in the special regime herby established…". However, beyond difficulties in matters of territorial claims and sovereignty, the draft Agreement also brought opposition to its vision of an organized Antarctic scientific commonwealth. At the request of France, the State Department further elaborated on this sensitive aspect of its suggested condominium:

> The United States proposal is intended to provide for complete liberty of *bona fide* scientific research. In order to promote the rational planning and carrying out of such research, the proposal recommends the development by interested countries, acting through the Antarctic Commission, of an overall plan of scientific investigation. It is hoped that each of the participating countries might undertake, upon completion of the general plan, so to plan its individual projects as to contribute to the accomplishment of some portions of that general plan. It is felt that this would be a useful arrangement to avoid duplication of effort, and promote full, well rounded investigation.

This statement could not by itself reassure the Antarctic claimants, and the overall powers of the proposed Antarctic Commission increased their reluctance towards the international regime being proposed. It is useful to recognize, nonetheless that the concept of a "general plan" and its intended purpose of avoidance of duplication of effort and promotion of "well-rounded" investigations, anticipated the decisions taken at the 1955-57 Antarctic Conferences for the preparation of the International Geophysical Year (IGY).

The US "Antarctic Commission" was countered by a less powerful "Consultative Committee" suggested by Chile in a draft "Declaration" leading towards an Antarctic *status quo*. A five-year standstill would de reinforced with the following ingredients: full exchange of scientific information, sovereign rights not to be prejudiced by new bases or expeditions, and no taxes should be imposed on fishing fleets of participant States (the last reference concerned licences imposed by Britain in Antarctica to whalers of other nations). The proposed "Consultative Committee" was considered by Australia as the "thin end of the wedge in whittling away national sovereignty and setting up the international regime favoured by the United States and the Soviet Union", a view also shared to a certain extent by Argentina.

The next proposal, coming from the UK, was radical enough to rally against it all the claimant States and to a certain extent, to alienate also the internationalist New Zealanders, since it advocated a strong "High Authority" with a centralized system of scientific planning vested in a kind of multinational enterprise without any links with the United Nations System.

The course of the International Geophysical Year (IGY) demonstrated in tangible terms that binding undertakings and concerted action in scientific programmes, location of stations, logistic support and sharing the results of scientific investigations could be achieved without transferring all the authority to a single scientific body. In 1958, ICSU established the Special (later Scientific) Committee for Antarctic Research (SCAR). During the Preparatory Meeting to the Antarctic Treaty the US and a majority of the negotiators supported SCAR as the scientific arm of the Treaty over a Chilean proposal for a Scientific Institute of the Parties. The informal ties of SCAR and the Treaty evolved during the years and the XIII ATCM (Brussels, 1985) incorporated SCAR fully, as a permanent observer, into the mainstream of the Antarctic Treaty System (ATS) in a still unfinished process of institutional development.

The Role of Antarctic Diplomacy in the Origins and Conduct of the IGY'

Rip Bulkeley, Exeter College, Oxford, United Kingdom

International scientific cooperation with respect to Antarctica was extremely rare before 1945. Between 1945 and 1950 it began to be aired as a possibility, and limited versions of it were provided by two expeditions. But words and action in respect of international scientific cooperation in Antarctica during this period need careful interpretation, according to the personal position and national context from which they originated. All contained elements of exclusion as well as inclusion, and continued to do so during the IGY.

It was no accident that citizens and officials of the United States led the way in advocating an international approach to Antarctica. As long as it was confined to their allies, it suited that country's perceived interests and superpower status. But the State Department's chosen solution met with general rejection. Behind the scenes the 1948 Escudero Proposal, from Chile, seemed to provide a way forward. But neither government was prepared to compromise its official policy by formally proposing it.

After 1950 the IGY provided a solution for this diplomatic impasse. No evidence has been found to prove either that the State Department prompted Lloyd Berkner to propose a Third Polar Year, or that he had even heard of the Escudero Proposal. But he was in the right place with the right credentials to have been briefed on it, and his surviving papers are regrettably incomplete.

Whatever the origins of the IGY, its Antarctic programme certainly was guided by diplomats. Though greeted at the time as 'non-political', it was simply *less* or *differently* political than previous activity in the region. Claimants went to 'their' sectors and issued proprietorial welcomes to 'visiting' expeditions. Non-claimants acted out their policies in turn. The United States prompted and materially assisted its allies to occupy as many locations as possible and took on extra ones itself, in a bid to exclude or at least to minimize Soviet participation. The Trans-Antarctic Expedition made a last gesture for British imperialism. The mother-daughter radio communications network was distorted by national interests. National flags, anthems and other symbols were flourished on all sides. And so on.

The transition from the IGY to the Treaty was bumpy. The United States proposed a one year extension for Antarctica and the Soviet Union responded that it should be for the whole IGY. The resulting International Geophysical Cooperation was a voluntary, piecemeal arrangement. Temporary stations became permanent after awkward discussions with national authorities. The United States bequeathed some of its extra stations to allies on a sectoral basis; the recipients affected to see this as endorsement. The actual negotiations were protracted and difficult, and came close to failure. The Treaty was only accepted by claimant governments as having no implications for their claims – in short, along the lines of the Escudero Proposal as demonstrated by the IGY. The actual Treaty regime, underpinned by SCAR, has slightly eroded this 'status quo' position, but lies beyond the scope of this paper. If recent events in the Arctic are anything to go by, one effect of global warming could be to awaken Antarctic claims from their long

hibernation.

It took 46 years from the signing of the Treaty for the first country with an Antarctic claim to install a permanent station outside 'its' sector. Even then, France did this jointly with non-claimant and fellow-EU member Italy. It remains the only such station.

The Development of Biology as a Discipline in Antarctica

Jason Davis, Department of Geography, The Ohio State University, Columbus, OH, USA

During the International Geophysical Year of 1957-58, biology was rarely included as a serious scientific endeavor and little was published on the subject. Yet today, biological studies comprise a substantial part of the current International Polar Year. This paper seeks to understand this growth in the amount and prominence of biology undertaken particularly on the Antarctic continent and its connection to larger trends in both the history of biology and the context of Antarctic science. What historical, personal, or institutional factors influenced this development? What are the prospects for biology in Antarctica for the future?

Getting the Science Done: Perspectives from McMurdo

Ann M. Dozier, Timothy D. Dye and Nancy P. Chin, Department of Community and Preventive Medicine, University of Rochester, Rochester, NY, USA

Undertaking research in Antarctica is inherently a complex process given the nature of the research, the wide variety of projects launched each season, the remote location, environmental conditions, and the short work season, October to February. McMurdo Station is the logistical hub for launching approximately 60 NSF-funded science projects each season. As science projects on the ice become more numerous and complicated the number of support workers increased concurrently. Support workers now outnumber scientists on the ice 4:1. Successful deployment of research projects requires coordination among those leading the various scientific endeavors and the McMurdo organization established to support them. Our team of social scientists examined the intersection of support and science in determining what factors contribute to successful deployment of projects and what barriers prevented successful completion.

Our mixed gendered investigative team lived and worked at McMurdo Station during portions of the three austral summers between 2002 and 2005. Through participant observations (work, community and leisure venues) and interviews across the spectrum of employees, supervisors and scientists, what emerged was a picture of the management of science based at or supported by McMurdo Station. This paper analyzes the interfaces of the scientists and the management/support organization during pre-ice planning and on-ice work at McMurdo and in the field. Specific attention is paid to how the organizational bureaucracy and the scientists' professional autonomy create inherent tensions and how these are exacerbated by the uncertainties of conducting science in a polar environment.

From EAP to EPICA: The Shaping of a European Effort in Paleoclimatology

Aant Elzinga, Department of History of Ideas and Theory of Science, University of Göteborg, Göteborg, Sweden

An earlier paper (Second SCAR history workshop, Santiago 2006) dealt with geopolitics, science and internationalism during and after the IGY. In it I briefly touched upon the case of the European Antarctic Project (EAP). After more than five years of preparatory meetings and discussion the EAP was abandoned in 1975. Although envisioning an ambitious mode of joint action on the part of several nations, EAP had in fact a viable research plan. Comparisons with more successful cross-country European collaborations, as in nuclear physics (CERN) and astronomy (European Southern Observatory – ESO), however reveal a number of crucially constitutive factors that were absent at the time.

After a brief rehearsal of the factors responsible for the failure to launch the EAP, the present paper focuses on the background history and success of the multinational European Project for Ice Coring in Antarctica (EPICA). Starting up in 1995, EPICA was coordinated by the European Science Foundation (ESF) and funded by the European Commission (EC) and national contributions from ten countries. It has proven to be very fruitful for understanding the climatic and atmospheric record archived in Antarctic ice. In particular EPICA involved drilling and analyzing two ice cores and comparing them with records from deep ice core drilling in Greenland.

When a first phase for EPICA was proposed for funding in January 1992 to the EC it was rejected. It was met with some of the same arguments as the EAP earlier, viz., that Europe is far away from and has nothing to do with Antarctica. Resistance again hinged on the extreme cost of the project, one of the factors responsible for killing the precursor project, EAP in the mid-70s.

In the early 90s the situation however was different. This time Germany, instead of its negativism in the 1970s, came forward to play a scientific positive role as science policy actor. A turning point came in 1992 when results from the analysis of deep ice cores drilled not only in Greenland but also by the French-Russian drilling team at the Vostok site in Antarctica were coming in to provide a strong scientific rationale for EPICA. The Rio conference on the global environment and sustainable development marked an important point of transition at the political level. A major conference under the auspices of the ESF, the "Grand Challenge Conference" organized by the Alfred Wegener Institute (AWI) and held in conjunction with a major SCAR conference in Bremerhaven in September 1994 finally "broke the ice".

The paper goes into some detail to consider both the scientific and political background to EPICA, as well as drilling site activities and the roles of some of the programme's most prominent advocates. It is shown how for various reasons Europe's road to EPICA actually went via Greenland. The EPICA programme originated in Greenland thanks to a powerful European network that evolved around the Greenland Ice Core Project (GRIP). From the late 1970s onward GISP involved Danish, US and Swiss collaboration, around shallow and medium ice

core drilling. These efforts in turn, however, had political and scientific roots that go back to the history of the Cold War and American collaboration with Denmark and Danish scientists in the wake of the establishment of the Distant Early Warning (DEW) radar line, and post-IGY work in ice coring and radio echo sounding across icefields. US/NSF collaboration with British radio-glaciologists and Danish radio engineers in radio echo sound mapping of large parts of Antarctica in the early and mid 1970s is also significant in the larger picture.

EPICA is an interesting example of both divergence and convergence of scientific and political interests that have a long-term history going back to some years immediately following IGY. Convergence of interests, finally, was conducive to establishing a major effort whose impact today goes beyond both science and the scientific advice to decision-makers faced with the problem of global climate change.

To the Great Unknown: Soviet IGY Antarctic Expeditions 1955-1958

Irina Gan, Institute of Antarctic & Southern Ocean Studies, University of Tasmania, Australia

The IGY commitment of the USSR in the Antarctic included conducting research and establishing bases on the most difficult to access and unexplored areas of the Earth's surface on the South Geomagnetic Pole and the Pole of Inaccessibility. The Directorate of the Northern Sea Route and the Academy of Sciences, the two institutions directly responsible for the Soviet program were confident that they had accumulated sufficient theoretical and practical knowledge on which to base their contribution to the IGY.

Notwithstanding this weighty body of knowledge, the Soviet scientists realized that Antarctic reality may prove to be quite different from the conditions that they had already experienced in the Arctic. Their foray into the interior of the Antarctic continent was the beginning of a journey into the great unknown.

In fact, there were many unknowns: the rugged terrain, the effect of high altitudes and extreme climatic conditions on men and machines and the constricted time – frames available to carry out work in the short austral summers. Also unknown were the circumstances of interactions with foreign governments and scientists.

The setbacks and obstacles encountered by the Second CAE in particular almost resulted in failure of the whole Soviet IGY commitment. However, the perseverance of the expeditioners and the ability to learn from their mistakes allowed them to overcome the obstacles and bring their plans to a successful conclusion.

British Antarctic Science, 1944-1959

Adrian Howkins, Department of History, University of Texas at Austin, Austin, TX, USA

This paper will examine the development of British science in Antarctica between 1944-1959. It will focus in particular on the relationship between science and politics during the active sovereignty dispute that took place between Britain, Argentina, and Chile during the 1940s and 1950s. By looking at the British perspective, this paper will "complete the triangle," of my investigations into the science and politics of the Antarctic sovereignty dispute – my previous SCAR papers have examined Argentine and Chilean Antarctic science over the same period.

This paper will begin by looking at the ways in which Britain used science both to facilitate and legitimate its Empire, especially in Antarctica. I will pay special attention to the Discovery Expeditions of the 1920s and 1930s and British claims that, through their sovereignty claims and research, they were seeking to promote the conservation of Antarctic whale stocks. In putting forward conflicting sovereignty claims to the Antarctic Peninsula region during the 1940s and 1950s, both Argentina and Chile sought to challenge British scientific authority in the region. My paper will continue by looking at the British response to this challenge. Rather than giving in to the South Americans, the British increased their scientific activity in the region, first with the wartime Operation Tabarin and then with the Falkland Islands Dependencies Survey. I will also look at ways in which Britain co-operated with international research efforts in Antarctica such as the Norwegian-British-Swedish expedition to Queen Maud Land between 1949-1952, and the International Geophysical Year (IGY) of 1957-1958. The paper will conclude by looking at the ways in which Britain – along with the United States – sought to harness the scientific goodwill generated by the IGY to bring about political change in Antarctica leading to the Antarctic Treaty of 1959.

The State of Chilean Science before and during the International Geophysical Year: An Interpretive Analysis

Consuelo León Wöppke, Universidad Marítima de Chile, Chile

This paper is based on the scientific journals, periodical sources, and government papers. It explores the state of Chilean science before and during the 1957-1958 International Geophysical Year (IGY). Convinced that its proximity and history established an irrefutable basis for its sovereignty over Tierra de O'Higgins, as the Chilean Antarctic is known, Chile assumed a cautious attitude toward the other IGY participants, especially Great Britain and the United States, whose motivations it distrusted. This paper reviews the state of Chilean science at this time before shifting emphasis to the role of political and scientific elites in shaping public opinion.

FONDECYT Proyect 1040187

Swedish Polar Policies 1955-1970

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During the 1950´s and 60´s Sweden kept on its polar research although the scientific endeavours had taken somewhat new directions after the previous and long-lasting Hans Ahlmann epoch 1931-52. Whereas the science of glaciology had been central the geophysics and geosciences came to the fore. The Arctic was the main target and the Antarctic was not to be visited again until the 1980´s. For the geophysical year, a scientific station was set up with Finland in Kinnvika, Svalbard, also with Swiss participation. The naval ship *Älvsnabben* acted as a supply ship for the expedition at the Nordaustlandet and a Catalina plane from the Swedish Air Force had been promised for assistance, to map the Murchisonfjord suitable for safety measures. The next expeditions undertaken to the Arctic were headed by Valter Schytt, pupil of Hans Ahlmann. He made several visits during the 50´s, to the Canadian Arctic, to north-western Greenland as well as a tour with the Russian icebreaker Ob. A second expedition to Murchison Bay IGY station was made in 1957 and 1958. In 1966 he worked at Kinnvika on a glaciological expedition headed by Stockholm University. In 1972 Schytt went to West Antarctica for studies of glaciers and in 1980 he was the scientific leader of the major Swedish expedition YMER-80 in celebration of the 100th anniversary of *Vega* with the ice breaker YMER, in the North East Passage.

The received view of Swedish engagement in polar areas is that all presence had to do with science. Evidently there was a great portion of science at the core of the expeditions but there were also other concerns. The topic of this presentation is that there were actually policies towards the polar areas, policies produced for entire other reasons than advancing scientific results. During this entire period there were severe concerns with the Cold War developments in the Arctic and the Nordic area. My argument is that this on several occasions had an impact on Swedish undertakings in polar areas. The instruments for vigilance, presence and continuous contacts with relevant actors were scientific research. Nevertheless, archive studies show that occasionally decision makers were hesitant on what course on action to depart upon, such as in the case of the political status of Antarctica in the 1950´s.

The International Polar Year (1957-1958) as Reflected in German Media

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In 1954, after the announcement of the International Geophysical Year (1957/1958), Antarctica came back into the headlines in West German newspapers. Territorial claims were seen in connection with the potential exploitation of mineral resources anticipated following Byrd's most recent expeditions, although the economic problems of mining were not yet solved. Instead of the internationalisation of Antarctica, an increased emphasis was seen on the strategic importance of Antarctica at the national level. Against this background, Karl Maria Herrligkoffer's proposal for a German South-Polar Expedition was described using military

jargon as participation in a "major scientific attack on the South Pole Land" to represent German claims. At that time Germany felt it had a legitimate right to be taken into account in the partition of Antarctica, not least because it had made significant geographical discoveries there in 1939.

Political and military rivalry between Washington and Moscow built up the discussion on international management, referring to mineral resources and flight routes from South America to Australia. Scientific preparations for the IGY were seen as components of a race to still unclaimed regions, and to reflect the economic and military demands of the great powers, which were considered to be looking for an expansion of their influence. In this context there was talk of Antarctica as a possible launching base for intercontinental rockets. In due course, the first five villages with altogether 400 inhabitants were established, in effect manifesting territorial claims in Antarcticadepots were set for the Trans-Antarctic Expedition of 1957/58.

Eventually the debate on Antarctica led up to the headline "Cold War in Antarctica" appearing in the magazine *Stern* (1956). Now the military aspect seemed dominant: Americans and Britons together wanted to challenge the superiority of the Russians in this arena, and the future of Antarctica as strategic geographical element in military operations was highlighted. In January 1957 a magazine headline announced a "Final battle for the South Pole" between America and Russia. While the claims to possession were in full swing, the appearance was given that science was being used to cover the power-political and economic-political race at the South Pole.

Military jargon was still used when the German journalist Heinz Steinitz, then living in New York, published a report in five parts in the *Süddeutsche Zeitung* under the headline "Fortress Antarctica will be surrounded!" between February and April 1957. Besides the scientific general staff, a military machine was described as an executive instrument of the scientific high command; this reflected the significant support for science by the military, especially in US operations. The journalist even resorted to national-socialist wording, using the expression "Triumph of science", which recalls Leni Riefenstahl's famous documentary movie on the national-socialist convention at Nürnberg in 1934, which was called "Triumph of will". Another reporter described the IGY as an "Invasion of scientific expeditions".

A new series of 14 parts from the star reporter Noel Barber of the *London Daily Mail* started in *Bonner Rundschau* at the end of December 1957. He described the ongoing events of the Trans-Antarctic Expedition led by Dr. Vivian Fuchs, which included Edmund Hillary's expedition to set depots between the Ross Sea and the South Pole. The tale became an adventure story with two protagonists. On the one hand there was the conqueror of Mount Everest, Edmund Hillary, who would become the third person to arrive at the South Pole by land on the other hand there was his fellow expeditioner, Dr. Vivian Fuchs, who had had a late start from the Weddell Sea coast, and whose scientific investigations of the ice thickness by seismic measurements slowed him down because they took such a long time. Barber also referred to a general mobilisation of the Soviets at the beginning of 1958, noting that they also want to participate in the exploration of the polar region. In his 6th report he mentioned the start of a "Cold War" between Hillary and Fuchs, a frosty relationship that reflected Fuchs's annoyance that Hillary would get to the Pole before him, and Fuchs's rejection of Hillary's idea that because of the slowness and delay of Fuchs's party they might have to winter over at the South Pole and continue the crossing of

Antarctica the following spring. Against this background, Hillary's unplanned and rapid advance towards the South Pole seemed to be a clear 'declaration of war'. Was Hillary entirely at fault? Barber suggests in Hillary's favour that it was well-known in Antarctica that Fuchs had made some mistakes. The tale has a happy ending. Fuchs arrived at the South Pole just in time, the absolute chief of the expedition, radiating intelligence and serenity.

Besides these newspaper articles some polar books were published in the two separate parts of Germany. In West Germany you could buy a regional geography of Antarctica, a history of polar research, and a description of both geographic poles, which concluded with a statement to the effect that Antarctica was the possible "scene, deployment zone of the next world war". In the German Democratic Republic a chronological account of the most important expeditions to Antarctica was published, also with an outlook of the upcoming IGY, but lacking any account of the national-socialist's "Schwabenland" expedition of 1938-39, which took the first aerial photographs of the mountains in Dronning Maud Land. The book ended with the expectation according to the Soviet occupying forces "that the results achieved under the guidance of the Soviet science will contribute to the peaceful advance and welfare of all mankind."

A regionally organised account of the discovery of the different regions of the Arctic prior to 1938 was published by the same author. In addition, a book on the milestones of polar flight described in great detail the achievements of the German "Schwabenland" expedition. The scientific results of that expedition were published by its leader and other scientists in West Germany in 1957-58. Finally a book sold GDR in 1959 gave a critical account of the "Schwabenland" expedition from the East German point of view, ending up with a description of the IGY, also using military terms.

The use of military terms to describe interests in Antarctica at this time was not entirely surprising given the ongoing Cold War and the enormous size of Operation Highjump in 1946/47 which was designed to train the US Navy in polar operations in the event of a possible war in the Arctic with the Soviet Union. It is therefore not entirely surprising that in Germany the scientific plans and endeavours of the IGY seem to have been more widely reported in scientific journals than in the press, while newspapers or popular books focused more on adventure, on mineral resources, and on the possible significance of Antarctica from the military (especially Cold War) perspective.

Playing Dice: Toward a Scientific Explanation of U.S. Leadership in the Formation of the Antarctic Treaty of 1959

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The U.S. role in the formation of the Antarctic Treaty has been thoroughly analyzed from a diplomatic perspective. Herein the focus shifts to the parallel which U.S. officials drew between internal and external communism. In 1946 President Harry S. Truman initiated a loyalty program to expel communists and communist sympathizers from the federal government, lest they undermine his effort to halt Soviet expansion. This program was reinforced by the well-

publicized declarations of Senator Joe McCarthy. When Eisenhower came to office, he strengthened the program and left in place legislation which outlawed the domestic Communist Party. Meanwhile the nation established a military presence in dozens of nations around the world based on the conviction that the Soviet Union should not be appeased.

This presentation maintains that, though U.S. Antarctic policy did constitute a form of appeasement, it was in keeping with other aspects of the nation's Cold War strategy. In the late 1950s officials sought to be more accommodating of the Soviet Union since they recognized that world opinion was growing increasing anti-American, and they needed to do more to counteract the impression that they were war-mongers. Alone their acceptance of peaceful coexistence at the bottom of the world did not and could not reverse this impression, but it deprived the Soviet Union of a further opportunity to criticize them. The nature of U.S. leadership in the formation of the Antarctic Treaty has often been glorified since the treaty was based on a U.S. proposal and signed in Washington. However, this presentation focuses on its inconsistency with a number of other factors which nearly led to the treaty's non-ratification, and which expose the non-commitment of U.S. officials to their own policy.

"What Has All This Got To Do With Science?" The Rhetoric of Scientific Devotion in the Planning of the IGY

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After a lunch replete with "strong drink," Admiral George Dufek – leader of the United States delegation to the Paris meeting of CSAGI (the Comité Speciale de l'Année Géophysique Internationale) in July 1955 – fell asleep during the afternoon session. Waking in the midst of a "long and rambling" presentation by a Soviet speaker, he instinctively shouted "what has all this got to do with science?" Embarrassed American colleagues quickly silenced their leader. While no harm was done, the episode suggests that during the planning of the IGY, devotion to science was not just a way of life for the specialists in the field, but an overarching discursive framework that determined how political aims could be expressed rather than eliminating politics altogether.

This paper focuses on British policy-makers, particularly at the Foreign Office and Colonial Office. I am less concerned with the motivations of the field scientists who have been identified as the chief constituency in most studies of the IGY. Did the widespread characterization of the IGY as purely scientific function as a political strategy, rather than the expression of its absence? How did the rhetorical configuration of science and politics as antithetical direct political action? Was the IGY, as Vivian Fuchs once said of the Falkland Islands Dependencies Survey (FIDS), inherently a "politico-scientific" activity – like all Big Science? This is a (very) early version of the final chapter of my dissertation, which examines changing conceptions of 'scientific' engagement with Antarctica in Scandinavia and the British Empire from the turn of the twentieth century to the 1950s, focused on the cultural and discursive history of the term.

The paper consists of a detailed analysis supplemented by two briefer, more comparative sections. In the first section, I will identify some roots to the discourse of scientific exploration as

normatively international, which emerged particularly strongly in the Norwegian-British-Swedish Antarctic Expedition (NBSX) of 1949-52. In the second, I will use British Civil Service records two examine two related strategies: separating IGY activity from legal title to avoid Britain's claims being weakened through increased foreign activity, and associating the prestige value of science with its separation from politics. Finally, I will connect British government involvement with the IGY to other elements of British Antarctic policy at this time, principally its sponsorship of the Commonwealth Trans-Antarctic Expedition (CTAE) and its relationship with the Scott Polar Research Institute (SPRI).

Science functioned as a means to practical ends but also a morally freighted source of prestige. This is true of practically the entire history of Antarctic exploration from the voyages of James Cook to the present. For British bureaucrats in the early Cold War, scientific activity was a means of maintaining title to disputed colonial territory that simultaneously maintained Britain's standing as a civilized nation. International cooperation could further both ends – especially the latter – as long as the partners were politically suitable. The Foreign Office recommended financial support for the NBSX, even though it did not involve British territory, because it would forge closer links with Norway and to a lesser extent Sweden. The implicit support for Norway's claim to Queen Maud Land would be reciprocated. Additionally, the expedition was widely advertised as an attempt to ascertain whether the world's climate was improving, with scientists from different nations working side by side in the quest to find knowledge of interest to all humanity. Like the IGY, the political value of the NBSX was tied to a strong, normative association between science and international cooperation, rhetorically contrasted to the tensions of the Cold War and trading on the cultural prominence of science.

The scale and geographic breadth of the IGY threatened British territorial claims while emasculating it traditional status as a leading Antarctic power. The need to maintain prestige had earlier led the Foreign Office to respond relatively positively to proposals for an eight-power condominium and plans for a 'standstill', in which all activity after a given date could not affect sovereignty. British participation in the IGY was deemed necessary because declining to participate in an international scientific venture would damage national prestige. Retaining a strict boundary between science and politics protected sovereignty claims while enhancing the IGY's value as an emblem of civilization. Those claims meant Britain had more to lose from the IGY than either the US or USSR.

The discursive conventions that governed CSAGI meetings, and defined the public image of the IGY, dictated that issues such as the location of bases be justified on identifiably 'scientific' or 'technical' grounds. Colonial and especially Foreign Office records convey a belief that British IGY scientists were political innocents requiring oversight. This was particularly evident at the Paris CSAGI meeting, where a Foreign Office adviser was on hand to give advice to the British delegation behind the scenes, and a Colonial Office bureaucrat was installed as head of the working group on radio communications. Detailed planning could safely be left to the Royal Society-led British National IGY Committee, but maintaining a purely scientific enterprise could not be left to scientists.

The institutional framework of British Antarctic activity also came increasingly to reflect the importance of 'pure' science to prestige. This was clearest in the CTAE, which uneasily traded on its status as both an athletic feat and a scientific investigation, and struggled to obtain support within the Civil Service. Upon completing the traverse, its newly-knighted leader Vivian Fuchs told Queen Elizabeth II by telegram that "our scientific work is completed." While the Commonwealth Relations Office championed the project as an opportunity for the "old" Dominions to do "something imaginative, adventurous, Elizabethan, & ultimately remunerative in a cooperative Empire adventure," objections from the Foreign Office were overridden rather than retracted. The support of the SPRI was eventually demanded on the grounds of government discipline, leading to the resignation of its director. In 1958 the directorship was given to the physicist Gordon Robin ahead of the leading candidate, Brian Roberts of the Foreign Office, as the Institute shifted from a semi-governmental information service toward a new identity as a university research center. In a way, the SPRI's path mirrored that of Antarctica itself.

So what *did* the IGY have to do with science? On the surface, everything: its function as an emblem of international cooperation in scientific endeavor made that essential. It is salient, however, to ask how and why the IGY came to possess that symbolic value, and to consider it as an integral part of a broader political picture.

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